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**LEARNING TO SURVIVE AMIDST NESTED CRISES:
CAN THE CORONAVIRUS PANDEMIC HELP US CHANGE EDUCATIONAL
PRACTICES
TO PREPARE FOR THE IMPENDING ECO-CRISIS?**

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Abstract

The ongoing ecological crisis and the more recent Coronavirus crisis challenge the grand narrative of Enlightenment that human beings are “masters of nature”. For millennia, human *social learning* has allowed *Homo sapiens* to outpace most of our competitor creatures and live a comfortable life, but this competitive success has resulted in cataclysmic failure for the ecosystem. However, people’s unique ability to learn gives us hope that we can overcome the nested crises, or learn to live with them. What is required is not more knowledge, but instead, collective learning to *change practices*, institutionalized in educational processes. Drawing on the *theory of practice architectures*, this paper discusses how education can help to form a new generation of children, young people, and adults equipped for the new post-Corona world, and equipped to respond appropriately to the eco-crisis. This requires significant changes to existing arrangements of education systems. What is needed is new practice architectures – new conditions of possibility – under which human beings can learn to live sustainably within the community of life on Earth.

Keywords: ecological crisis, COVID-19, practice architectures, social learning

Introduction: the nested crises of our times

We are writing this article in an era of multiple, nested, global crises. Recent estimates (presented at the Australian National Climate Emergency Summit, 2020) predict that the current rate of carbon emissions on Earth will produce a world temperature rise of 1.5° Celsius, the maximum many scientists believe will leave us with a sustainable planet, by 2030 – a mere ten years from this time of writing. And if the world proceeds on a business-as-usual path, those scientists estimate a rise of between 3° and 4° Celsius somewhere between 2050 and 2100, which would probably lead to catastrophic worldwide ecological collapse. This means, according to researchers across fields including biology, ecology, palaeontology, history, geography, economics, and system theory (e.g. Barnosky et al., 2012; Randers, 2012), that we are on the threshold of a planetary state shift, threatening our planetary systems. This development goes hand in hand with the sixth wave of mass extinctions of species, caused not only by climate change but also by habitat destruction, overhunting, pollution, and invasion of ecologies by alien species. The consequences of these crises for human beings include increasing poverty and inequality and forced migration as habitable areas and resources diminish.

The most recent addition to this family of crises is the Novel Coronavirus, which jumped out of the natural world to reach humans, travelling across the bridge of – so we are led to believe – an undercooked bat (see, e.g., Irving, Ahn, Goh, Anderson & Wang, 2021). Some argue that ‘wet markets’ and increased human contact with wild animals are to blame; others believe the pandemic is a consequence of a persistent and excessive intrusion in nature, of which the vast illegal wildlife trade is only part (Johnson et al., 2020). The complex ecological crisis and the recent Coronavirus are two examples of the many intertwined crises all rooted in the same dysfunctional and highly damaging principles that have come to dominate our way of living.

It seems to us that, around the world, people are increasingly aware that all these crises come from a single source. Through these crises, ‘Nature’ reminds us of something blatantly clear for the readers (see for example, Taylor, 2017): that we are part of it, not above it or (pardon the pun) immune to it. While the Coronavirus bluntly threatens us with murder, the climate crisis offers us the slow cooker: a gradual deprivation of the conditions for human life on the planet, along with the life of millions of other species on which we depend. The interconnected nature of these crises has already attracted plenty of attention in a short time (Johnson et al. 2020; Saran, 2020), as has the fact that the Coronavirus forces humanity to look in a mirror (Howe, 2020; Saarikoski, 2020; Žižek, 2020). Regardless of how *Homo sapiens* will survive these crises, life as we know it might soon be history: in the near future, the Earth might not have an ecological niche for the human species (Xu et al., 2020), and even if it does, the Earth’s resources might only be sufficient for a world population of about one billion human beings, rather than the current world population of nearly eight billion (Australian National Climate Emergency Summit, 2020). This would mean that our comfortable societies, including the whole economic and social way of life based on the exploitation of nature (global capitalism), will no longer exist.

The Coronavirus has shown how drastically and rapidly our societies can change in the face of a crisis. The severity of the climate crisis has been known for decades (see, e.g., review symposium on Normalising Catastrophe; Reid, 2013; Reid, 2019), but it seems to us and others (e.g. Howe, 2020) that we needed the Corona crisis to awaken humans from an illusory sense of security into radical insecurity and uncertainty. In December 2019, we took the world order for granted; in general, we regarded it as stable. We may have imagined that societies based on exchange economies, with elaborate divisions of labour and vast, highly interdependent networks of global exchange, would be resilient to occasional shocks. The COVID crisis has reminded us that our world is *not* functioning stably and predictably. Changes in subsystems in response to the pandemic have severely destabilized the entire global system.

Human responses to the pandemic have demonstrated that, contrary to the arguments of the climate change sceptics, our species *is* capable of making rapid and massive changes to our existing practices. This sounds like good news: a rapid change in our social practices in response to the COVID-19 suggests that humanity may be able to make rapid changes to meet the challenges of other crises, too. Furthermore, global responses to the pandemic have already been favourable for the climate emergency: pollution rates have dropped; consumption has decreased. Societal restrictions globally have been exceptionally well obeyed. But the news is not all good. While the Coronavirus crisis certainly shows that humans have the ability to react, humanity may nevertheless lack sufficient ability to act

predictively (Hukkinen, 2020). It is also possible that societies have just pressed the pause button, expecting that, after the Coronavirus crisis is over, we may revert to business as usual, consuming and polluting as we did before.

While we have plenty of information about the intertwined roots of these crises, there seems to be less talk about how this is first and foremost an educational issue, and how a way out is through our human capacity to learn. As a learning animal, *Homo sapiens* is capable of learning and adapting to an extent unmatched by any other species. We argue that we do not need to learn more *knowledge* (we have plenty of that). Instead, we need to learn how to change human *practices* (see, for example, Kollmuss & Agyeman, 2002) in order to survive.

In this conceptual essay, we discuss how education can equip a new generation of learners for the crises of our era. We are by no means the first ones to propose educational responses to these or other crises (see, for example, Giroux, 2020; Jickling & Sterling, 2017; Reid, 2013). Our contribution to this discussion is to conceptualise social learning as a *practice changing practice*. In particular, we do this by engaging with the theory of practice architectures which we, with colleagues, have developed since 2008 (Kemmis & Grootenboer, 2008; Kemmis et al., 2014). In this article, we argue that the theory can help us map out some new conditions of possibility for more sustainable educational practices for the future.

Homo sapiens as a learning animal

Although the adaptation and evolution of all species can be understood as evolutionary learning (Barnett & Jackson, 2020, p. 5), as far as we know, abstract learning is a species-specific feature of human beings. Human beings would not have won the struggle for survival with competitor species (including ancient hominins) on the basis of speed, strength, or physical attributes in general. The principal evolutionary advantage of *Homo sapiens* was the development of elaborate shared languages which opened communicative space between members of shared language communities. At first just in the form of cries and noises to orient other members of the troop or clan to such things as the presence of a predator or food, the mutual orienting function of human languages developed to an extraordinary degree, forcing changes in the size of the human forebrain, and eventually encompassing vast constellations of shared human knowledge. This semantic dimension makes social learning possible – that is, learning that is not merely an individual-psychological process, resulting in knowledge possessed by individuals, but rather the shared accomplishment of a particular linguistic community (including the speakers of specialist discourses in particular fields) (see also Lave, 2019).

Based on our earlier research and conceptual work, we have argued that this social learning takes place in three-dimensional intersubjective spaces, which exist in the media of language, work and power/solidarity, in which we encounter one another in the world (Kemmis et al., 2014). The social learning of human beings is made possible by nuanced languages that enable us to enter semantic spaces of such complexity and subtlety that our capability to survive and thrive has far outpaced most of our competitor creatures. Most of the knowledge that individuals acquire comes from the knowledge present in the logos of shared languages. But the social learning of human beings is not confined to semantic space. It also includes most of the skills people acquire as they engage in the shared activities and work of different groups as they encounter one another in physical space-time. And the social learning of human beings also includes patterns of feeling and emotion, attitudes, and values

that individuals acquire as they engage in the solidarities (patterns of belonging) and power relations of their social spaces. These three ‘dimensions’ – semantic space, physical space-time, and social space – together constitute the intersubjective space in which people encounter one another and the world (Kemmis et al., 2014). This has parallels with Marcia McKenzie’s (2008) writing about critical pedagogy and its ecological and social realms. McKenzie (2008) argues that what she calls socio-ecological learning does not occur via “cognitive critique or embodied place-based experience, but rather as taking place in between the thought and the sensed via a range of intersubjective experiences. (p. 362)” Likewise, Gert Biesta (2020) argues that learning happens simultaneously on the three domains of qualification, socialisation and subjectification. Qualification refers to the transmission of skills or knowledge, and socialisation means learning to act according to what is considered as being of value in one’s community. Finally, subjectification to our freedom as human beings, to act or refrain from action. Jean Lave (2019), in turn, builds on her influential book with Wenger (1991) and maintains that through social learning, people can undermine, upset, reorder – change – the social processes that compose social life.

What do these thoughts have to do with our learning to live with crises? Since the dawn of *Homo sapiens*, human beings have developed extraordinarily evolved capacities for mutual understanding in language (in semantic space); vast repertoires of coordinated actions (in physical space-time); and a variety of forms of group solidarity, insider-outsider relations, and power relations (in social space). While social learning has usually resulted in a more comfortable life for human beings, we now know that not all such learning has been good. We are now in a situation in which we need to learn to weigh survival over some of our acquired benefits (like engines powered by fossil fuels). This is the dual consequence of the use of human reason, as described by Horkheimer and Adorno (1972) in the concept of the Dialectic of Enlightenment: on the one hand, the consequences of social learning are useful, but, on the other hand, that same learning has pushed humanity to the edge of a deep abyss. Our competitive success as a species has brought cataclysmic failure for ourselves, along with the many other species on which we depend, and the many other species on which *they* depend. We are tearing holes in the fabric of the web of life, and sending some established patterns of equilibrium between species spiralling out of control not just temporarily, but permanently. And, that is to say, into unsustainability. Problems created by human beings now threaten the survival of human beings. Going back in the evolutionary cycle is not an option, so the only solution is to adapt, learn more, and learn to do things differently within the ecosystem of which we are part. As Fritjof Capra (2013, p. 202) puts it: “In the coming decades the survival of humanity will depend on our ecological literacy, on our ability to understand the basic principles of ecology, and to live accordingly”.

Thus far, we have argued, in line with authors such as Biesta (2020), McKenzie (2008), Lave (2019) and many others, that learning is not (only) a psychological process, by which individuals acquire knowledge, but that most of all a *social* process, supported by and in linguistic communities, communities of practice, wider communities, and societies. Coming to know how to go on (Kemmis et al., 2014; Wittgenstein, 1958) in the language games, activities, and solidarities of a community may happen without great self-awareness in the everyday life of communities, but, when societies and communities want consciously to ensure that rising generations come into the shared patrimony of a community’s cultural, economic, and social and political life, they initiate processes of *education*.

From social learning to institutionalised education

Social learning is so crucial to the cultural, material, and social reproduction of societies that, over many centuries, it has been *institutionalised* in a variety of organisations. In these organisations, the principal task has been to support the learning of rising generations of children, young people and adults in line with the contemporarily accepted aims. Schools had an important role in training needed workforce for society and conserving the existing social order. Schools were not developed to invite critical thinking, transgression or raise generations who would challenge the status quo. (Stevenson, 2007). In the West, education has been the responsibility of temples, churches, monasteries, and other religious institutions; the philosophical schools of ancient Greece; and guilds in the Middle Ages. In time, these institutions were gradually transformed into universities; elementary and secondary schools of many kinds; vocational education colleges; organisations for adult, community, and popular education; and kindergartens and early childhood education centres (Kemmis & Edwards-Groves, 2018). Each of these organisations gradually developed by their own internal traditions of curriculum (what to teach), pedagogy (how to teach it¹), and assessment (how to determine whether learners met standards sufficient to be regarded as qualified in the subject matter being studied) – what Basil Bernstein (1975) called ‘the three message systems’ of the school.

Ever since schools emerged as distinctive institutions, there has been a permanent, potential contradiction between *education* and *schooling*, in which schooling risks becoming non-educational, or even anti-educational, and thus a hindrance to the society it serves. In our previous writings, we have argued that schooling is *educational* when it promotes the values of (1) rationality and reasonableness, (2) productivity and sustainability, and (3) justice and democracy (Kemmis & Edwards-Groves, 2018) in its curriculum and pedagogy. With the current crises we are facing, it has become poignantly clear that these aims are merely empty signifiers if they overlook our interdependence with other species on the planet, and our position in the community of life on Earth. Even if the aims of schooling place humans at their centre, as they often do, their outcomes are hardly rational, reasonable, productive (at least in the long term) and certainly not just, democratic or sustainable if they are based on the idea of human exceptionalism. Holistic consideration of the purpose of education has long been one of the cornerstones of environmental or sustainability education (Munkebye et al., 2020; Jordan & Kristjansson, 2017; Sterling, 2017; Stevenson, 2007), and in line with the European focus on *Bildung*, namely, the process where knowledge, values, morals and politics come together to foster “being and becoming a human being; the interplay between the individual and the society (world); and the practices by which pedagogical influence is organized in order to enhance the self-formation and development of a rational subject” (Hardy et al., 2015, 384; see also Biesta, 2020; Breznika, 2017). So, we do not aim to reinvent the wheel, but we argue that the current crises have brought new urgency and hope to tackle this issue.

Educational systems now or in the past rarely intentionally choose to promote unreasonable, unsustainable or unjust forms of life. However, some taken-for-granted aims of

¹ In much of Europe, the question of how to teach is discussed in terms of *Didactics*, not *Pedagogy*. In much of Europe, *Pedagogy* is the overarching field that covers all aspects of upbringing, including what to teach and why, the nature and purpose of education, and the history and evolution of different pedagogical approaches like progressive education or constructivist approaches.

our current school systems, implemented in their curricula and pedagogy and supported by a range of actors such as politicians, teachers or parents, might in fact do that. Some subtle forms of anti-educational forms of schooling include, for example, well-meaningly advanced chemical and agricultural education which have led to the widespread use of ecologically-dangerous herbicides and pesticides, and the advancements in unethical production systems responding to consumers' calls for cheap and fast fashion. These developments have speeded up the “seemingly suicidal contest to make the most efficient climate-destroying knowledge”, as Jenssen (2020, no page) dramatically puts it. Other drastic unjust products of schooling include, for example, school systems based on apartheid or types of segregation. They are products of schooling which education is meant to get rid of.

The contradiction between education and schooling is not a new problem; the great and small historical changes that occur in languages and cultures – in material, economic, and environmental conditions, and in social and political conditions – make this an endless battle (see, for example, Andersson & Öhman, 2016; Stevenson, 2007). Goals of education are usually the product of stormy periods of contestation, and, once settled, there is resistance to reopening debate about them. In the past (and in some places still today), the goals may have emphasised, for example, religious beliefs, nationalism or communitarian ideals. In most liberal democracies today, the goals include notions of preparing people for productive work, and for active citizenship. These “horizons of significance” (Taylor, 1998) reflect, and are reflected by, the currently accepted ideals of what individuals and societies should desire (Värri, 2018).

So, would it not seem prudent to choose the survival of human species as the horizon of significance for our contemporary era? Surely, fostering the human ability to respond to crises on a large scale cannot rely on the morality and will of some individuals. We have seen that without time or capacity to process knowledge, individuals respond to crises with emotion and panic (Clarke, 2003; Žižek, 2020), which rarely leads to good outcomes. Alternatively, a crisis may cause positive changes in human practices, but things then ‘snap back’ to the old ways as the situation normalises (Bavel et al., 2020). Since we know this is how people may act in crises, we need institutionalised education committed to supporting rational, large-scale, and sustainable changes that are beneficial on a planetary level².

We know changing education so it will be ‘good’ for all is a big task, as there is no obvious single way ‘up’ or ‘forward’ for cultures, economies, and societies, which could guide the transformation of the curricula of educational institutions in response to these crises. In fact, the classic upwards and onwards-narrative is a large part of our current problem. Yet we see education as a *promise* to change some of the current practices, and this promise should be interpreted within an eco-social framework, with sustainability as its central aim. We note that sustainability may be at odds with some other possible aims, such as the goal of maximising profits (Andersson & Öhman, 2016; Hursh et al., 2015; Nussbaum, 2016); just as the goal of fair distribution (Rawls, 1971) of wealth and wellbeing is at odds with the goal of ‘just acquisition’ (Nozick, 1974) and reward for individual risk and effort. There are many such binaries. The task for education is always to find a dialectical resolution between the apparent binaries – to find a perspective from which both sides can be

² For the same reason, crises such as COVID-19 seem to make individuals increasingly willing to take orders from governments. Thus, it can be argued that large-scale crises change fundamental relations between state, civil society and private enterprise.

comprehended and acknowledged simultaneously (although sometimes the wisdom of Solomon³ might be required to resolve the choice). A further problem is that in times of crisis, regardless of whether they are wars, financial crises, or ecological crises, there is a tendency for education to appear somehow irrelevant or unimportant (Appadurai, 2020). People's attention is focussed elsewhere, on the crisis. In our view, however, the situation should be the opposite; crises reveal fractures in our usual ways of understanding the world; our ordinary modes of life; our usual ways of relating to one another, and to the community of life on Earth, and to the Cosmos. The response of governments to the Coronavirus crisis has revealed some deep flaws in the *status quo ante*. Recognising these flaws, there is some appetite for ensuring that the post-pandemic world will *not* 'snap back' to the *status quo ante*. Crises reveal that we need to change our existing understandings, modes of action, and ways of relating to others and the world. We need to unlearn, re-learn and learn anew (Sterling, 2017). On this view, a rational response to the crises would be to encourage people and governments to enter a phase of reconstruction in some ways like the reconstruction that occurred after the Second World War, when the social welfare systems of many countries were extended in the interests of all. On this view, crises highlight a need for a new form of education: *education for cultural, economic, environmental, and social reconstruction*⁴. So now there is a new challenge. What kind of education is needed to help form new children, young people, and adults equipped for the new post-Corona world, and equipped to respond appropriately to the eco-crisis?

A third crisis: a crisis for education

A paradox arises: if non-educational or anti-educational forms of schooling have been partly responsible for causing the greatest crises of our times, how is education now to be part of the solution to them? If education has contributed to the processes of cultural, economic and social reproduction that have brought humankind to the brink of the eco-catastrophe, education in its proper sense is needed to disrupt the horizons of significance, worldviews, and meaning systems, as well as the 'logics of life' (Stanner, 1979, p. 324) that were secured by those reproduction processes.

For us, education, properly speaking, is:

[T]he process by which children, young people and adults are initiated into forms of understanding, modes of action, and ways of relating to one another and the world, that foster (respectively) individual and collective self-expression, individual and collective self-development and individual and collective self-determination, and that are, in these senses, oriented towards the good for each person and the good for humankind. (Kemmis et al., 2014, 26).

This is only one attempt to conceptualise the purpose of education; there are many others that aim for the good of humankind (see, for example, Biesta, 2020; Lotz-Sisitka, 2017) or more broadly for all life forms (Affifi, 2020a). In fact, definitions like ours, centering the good for each person and humankind can be rightly criticised for anthropocentrism (see, e.g., Affifi,

³ Faced with two mothers, both of whom claim a baby is their own son, Solomon offers to cut the child in half, believing that the true mother will reveal herself by offering to forego, and thus save, the child.

⁴ The idea of education for social reconstruction was proposed by Dewey and Childs (1933, as cited in Zuga, 1992).

2020a and b; Taylor, 2017; Quinn et al., 2016). We understand the partiality of this definition, and that it does not adequately highlight how (or whether) we acknowledge our place as part of the world. Human and non-human life-worlds are inextricably entangled, and that the good for humankind cannot be not secured in a vacuum. Yet as educational researchers and theorists of social practices, our tools are limited to understand *human* practices, and educational responses to those. Human action continues to be crucial in history, in the world we live in, not just in knowledge, but in practice:

Practices of education aim to initiate students into *practices* of self-expression, to secure a culture based on reason; into *practices* of self-development, to secure a productive and sustainable economy and environment; and into *practices* of self-determination, to secure a just and democratic society. (Kemmis & Edwards-Groves, 2018, 134; emphases in original)

In this view, practices of self-expression, self-development and self-determination shape history, and these practices intertwine and overlap. They create an ecology of practices, combined to make up an organic *project of a practice* (Kemmis et al., 2014; see also Wals, 2020, about learning ecologies). So, learning practices fostering an environmentally, economically or socially sustainable culture are only analytically separable from those leading to a culture based on reason, trust and justice; in practice, they are all interrelated and interdependent.

Arguably, institutional education in most parts of the world – schooling, at every level – has not done a very good job of producing such individuals, or such a shared social world (Fazio & Karrow, 2013). Schooling, especially at upper levels, has been guided principally by educational goals aimed at providing workers for the economy, and citizens and administrators for civil society, the state, and private enterprise (Hursh et al., 2015). Despite these preoccupations, many educators around the world have helped to lead processes of cultural, economic and social transformation in their countries by championing education *in, about, and for* the environment; in other words, *Education for Sustainability*, or *sustainability-oriented learning* (Wals, 2020) or simply education that acknowledges that something is fundamentally wrong – with education itself (Jickling, 2017).

Taking this seriously on institutional levels requires a counter-hegemonic approach problematising everything in the old logic of life, as some students and teachers have already done; questioning the goal of unlimited growth and introducing a new logic of life, the goal of which is survival within the ecology of the biosphere (Värri, 2018). In this logic of life, human beings are a species *within* and not *above* Nature (see also Affifi, 2020a; Affifi, 2020b; Andreotti, 2020; Næss, 1989). We are part of the community of life on Earth, just one among many millions of species, and profoundly dependent on that web of life for our own survival. The good for humankind turns out to depend on the good for all other species on this planet. Jackson and Barnett (2020, p. 6) say, “Humans are fundamentally ecological beings and making ecological sense of the world is at the root of much wisdom for survival”. This has also been acknowledged in writings on ecosophy (Savin-Baden, 2020; Næss, 1989) and eco-social wisdom (Heikkinen & Kukkonen, 2019; Salonen, 2014), both of which call for more critical thinking about our values, responsibilities and the skills people need to act to avert the eco-crisis (Heikkinen & Kukkonen, 2019).

In our view, however, a profound additional change is needed if education is to really address the eco-crisis. As is clearly understood by the hundreds of thousands of students around the world who are protesting inaction on climate change, the problem is *not* a lack of reliable knowledge about the climate crisis; the problem is a lack of action (Breunig et al.,

2014; Kollmuss & Agyeman, 2002). One of the reasons for this lack of action is rooted in the distinction between *education* and *schooling*: it is a profound disruption of the relationship between human knowledge and human social practice. Education for practice looks a little different from education for knowledge.

Education as a practice-forming practice

If education aims to help us to live well in a world worth living in, then, it must prepare us for practice. Indeed, as Kemmis and colleagues (Kemmis et al., 2014; Kemmis & Edwards-Groves, 2018) argue, our knowledge and our learning arise from, represent, recall, anticipate, and return to their use in *practices* that happen in the shared intersubjective spaces in which we encounter one another, the community of life on Earth, and the Cosmos. It is through our practices that we human beings participate, alongside other species, in the community of life on Earth. Education must be concerned with producing, reproducing, and transforming people's practices so they participate in the life of the planet in sustainable ways. And here's the thing: the role of education does not end with the transmission of *knowledge* for sustainability; for education to accomplish its aim of helping people to live well in a world worth living in, it must produce, reproduce and transform people's *practices* so that, not just in possibility but *in fact*, human beings live sustainably on the planet. And this, in turn, means that educators cannot rest until they have accomplished the sustainability of the community of life on Earth.

Practices and practice architectures

So: what are our practices? Space does not allow us to go into adequate depths to elaborate our view on practices (see more discussion in, for example, Kemmis et al., 2014, but we would like to note that we see practices as composed of combinations of *sayings*, *doings*, and *relatings* that hang together in the *project* (purpose) of the practice. Sayings, doings and relatings do not exist on their own. As noted before, the theory holds that people encounter one another and the world (including the community of life on Earth) in three dimensions of *intersubjective space*:

- in *semantic space*, in the medium of *language*, people encounter one another as *interlocutors* – through their sayings;
- in *physical space-time*, in the medium of *activity* and *work*, people encounter one another as *embodied beings* – through their doings;
- in *social space*, in the medium of *solidarity* and *power*, people encounter one another as *social and political beings* – through their relatings.

So: practices *happen* in the form of sayings, doings, and relatings. But our practices do not happen at the sole discretion of the one enacting the practice. Our practices are enabled and constrained (prefigured; Schatzki, 2002) in each of these dimensions by different kinds of arrangements found in or brought to the *sites* (Schatzki, 2002) in which we practise:

- *cultural-discursive arrangements* that enable and constrain the sayings of a practice;
- *material-economic arrangements* that enable and constrain the doings of a practice;
- and
- *social-political arrangements* that enable and constrain the relatings of a practice.

These three kinds of arrangements exist around every practice, enabling and constraining it in those dimensions. Moreover, in every site (Schatzki, 2002; Kemmis et al., 2014) for practice, for example a school or a classroom, these three kinds of arrangements combine with one another to form *practice architectures* which constitute the conditions of possibility for the practice: the conditions which shape the way the practice can unfold. Practices are entangled with particular combinations of arrangements found in or brought to a site; practices exist, Schatzki (2012) says, in “practice-arrangement bundles”. Practices do not exist independently of arrangements. Practice architectures are to practices what the bed and banks of a river are to the river; they direct its flow. But it also happens that, just as the river in flood can alter the shape of its bed and banks, practices can also alter the practice architectures that enable and constrain them. To change a practice in a sustainable way, then, requires changing the practice architectures that make the practice possible.

While some (e.g., Gherardi & Strati, 2012) take an epistemological view of practices, understanding them principally in terms of the knowledge needed to perform practices, we and others (e.g., Li & Krasny, 2019; Schatzki, 2002, 2013; Kemmis et al., 2014) take an *ontological* view of practices. On the ontological view, practices are to be understood as intertwined with the materiality of the world. Practices *happen*, and their *happening-ness* is entangled with the happening of other things and events in the world. In order to understand social practices ontologically, we must also recognise how they play different kinds of roles in broader ecologies of life. This is in line with Savin-Baden (2020, p. 46) call to broaden the narrow definition of ecology to include three interrelated ecologies of environmental, mental, and social worlds (see also Guattari, 2000).

As we confront the Coronavirus crisis and the eco-crisis, our situation demands education that acknowledges the intertwined nature of these worlds (mental, environmental, and social), and in which people find a sense of compassion and responsibility for the human together with the non-human world (Kemmis & Mutton, 2012; Martusewick et al., 2011; Värri, 2018): the community of life on Earth.

Education to address the crises

As we argued above, crises highlight the importance of education, and confronting the current crises, including the Coronavirus crisis and the eco-crisis, requires new forms of education aiming for cultural, economic, environmental, and social reconstruction. Crises reveal fractures in former ways of living and create the need for new knowledge. Crises also swamp people with information to be processed and evaluated. In the time of the Coronavirus crisis, some people have become confused about what the crisis is, and how to deal with it. (We think, for example, of the devastating effects for people who believed the misinformation that the Coronavirus could be treated by taking disinfectant, or how some people still believe that ‘climate change’ is no more than the natural fluctuation of climate, which cannot be stopped by humans.) So how should education be changed to better equip students to face the crises?

It seems to us that there are three eternal broad alternatives for educational reform at moments of crisis:

- (1) to prepare children, young people, and adults to go back to the old ways (assuming the crises will pass), or

- (2) to prepare them for new ways to live in, through, with and/or after crises, or
- (3) to prepare them for an uncertain post-crisis future by travelling at the slowest possible pace commensurate with making enough change to satisfy enough people, while denying the excesses of the desires of the conservatives and the radicals.

We vote for the second option. We think that we need to consider the practices and consequences of education in bringing about changes to existing arrangements to produce new practice architectures – new conditions of possibility – under which human beings can live sustainably within the community of life on Earth. This does not require abandoning everything within the existing systems; that would be a naïve and unnecessary goal (Stevenson 2007). However, it means we must acknowledge that achieving a sustainable way of life is not just about our relationship with nature or the material world or about changes in the economic system (i.e. material-economic arrangements). Development of cultural, economic, ecological, and social sustainability must go together. For example, if the carbon footprint of people in the Western countries is many times larger than that of people in developing countries, people in the West need to cut their carbon footprint. The injustices between and within societies mean that the less well-to-do suffer more when tough ecological decisions are made. This burden must be shared more equitably, and in a sustainable way, which is why change is not possible unless we develop practice architectures that allow for fair decision-making between people and groups of people (i.e. social-political arrangements). Finally, it matters how things are discussed or conceptualised in our Western cultures; concepts like the greenhouse effect, climate change, global heating or a planetary ecocatastrophe imply a very different level of urgency (i.e. cultural-discursive arrangements). And as Arne Næss reminds us, ecosophy is about facts as well as about value statements, norms and rules of conduct (Næss, 1973).

We are not alone in proposing that drastic, global changes in education are needed to address the crises of today. Stephen Sterling (2017) argues the state of the world requires that we transcend our dysfunctional worldview by broadening perceptions (the affective dimensions), shift towards relational thinking or conception (the cognitive dimension) and manifest integrative practice (the intentional dimension). Crises such as those caused by the Coronavirus or the ecocatastrophe are typical wicked problems (Block et al., 2018; Churchman, 1967); they are difficult to solve because they are difficult to define; there is no single solution to the problems; and they are so complex that they have no determinable stopping point. Trying to solve wicked problems from one point of view creates problems on others. Thus, it is not enough to change one or even a few components, but to make changes to the whole, i.e., the entire planetary architectures at the same time. Solving challenges educationally, in the broad and proper sense of the word, requires significant changes to existing arrangements of education systems. This requires rethinking, broadly, the design, ethos and culture of schooling, as well as more tangibly, its curricula, pedagogy and assessment. What is needed is new practice architectures for new education – new conditions of possibility – under which human beings can learn to live sustainably within the community of life on Earth.

In short, in order to steer education away from destructive practices and towards more sustainable practices, we need to change practice architectures of schooling. Table 1 below uses the theory of practice architectures to illustrate some ways in which it could be done. The nested crises of Corona and ecocatastrophe are merely used as examples; the table could

be used with any other examples to see how the cultural-discursive, material-economic and social-political arrangements intertwine into enabling or constraining our social practices.

	Examples of destructive practice architectures	Examples of practice architectures for sustainability	Implications for education
<i>Cultural-discursive arrangements</i>	Superstition or belief systems that are not based on scientific knowledge: mis/disinformation, denialism, trivialisation, polarisation of views.	Decisions based on scientific facts; seeking new ways of using language and cultural interpretations for the ecological challenge, encouraging critical thinking.	Teaching climate science; using concepts that do not undermine the crisis; discussing values and ethical considerations; basing teaching on an understanding of how politics, spirituality, values, etc. connect with sustainability.
<i>Material-economic arrangements</i>	Global capitalism aiming for endless economic growth and the acceleration of material production.	A production system acknowledging the limits of resources; new ways of using renewable resources.	Practising sustainable living in and beyond education; implementing actionable teaching; supporting transformative learning; modelling forms of sustainable living adapted to different ecological and social settings.
<i>Social-political arrangements</i>	Laws, regulations, and policies that protect the interests of people benefitting from oppressive political and economic power, based on the overexploitation of natural resources.	Laws, regulations and policies that support ecologically, socially and economically sustainable use of natural resources and renewable energy.	Opening up spaces for discussing global inequities; inviting transgressive thinking; developing more equitable and ecologically sustainable distribution; learning from social movements and indigenous ways of life

Table 1: Examples of educational practice architectures for a sustainable world

A reader can quickly see that this table does not present a comprehensive, one-size-fits-all solution for addressing any crises in education and teaching. What this table does suggest is that a change towards more sustainable learning needs space for relational, critical, actional, ethical and political pedagogy (Wals 2020), some of which would be in contradiction with the current aims of practices of schooling. Considering the needed changes in the light of the practice architectures that might enable or constrain them, in our view, would help to shape schooling that would be both more educational and more responsive to these crises of our times. In other words, we need to build new conditions of possibility to produce, reproduce, and secure a sustainable world through education.

The Coronavirus crisis has shown us that constructing new conditions is indeed possible. Governments around the world made massive cultural, economic, social, and educational changes to address it, despite the forebodings of those resisting urgent action to address the climate emergency. In society, new practice architectures have become apparent as governments have changed laws to restrict people's movements to preserve social distancing

and reduce transmission of the Coronavirus, for example. The Corona crisis shows that taken-for-granted architectures can change to rapidly achieve vast changes in social practices; thus, equally, for example, those architectures could be changed to produce rapid changes in the extent of our reliance on fossil fuels. The wicked problems of Coronavirus and ecocatastrophe share their roots in our ways of living, and we argue they can be addressed by changing educational practices. We argue that we should learn ways to draw upon the community's emerging forms of understanding, emerging modes of work and activities, and emerging ways of relating to one another and the world, and institutionalise this process of social learning into new or transformed processes and practices of education. It is too early to say how or whether it will happen, but we wish this paper offers some tools to imagine new conditions of possibility for education under which human beings can learn to live sustainably within the community of life on Earth.

Conclusion

In this paper, we have argued that even though it is our current *practices* as human beings that are putting unbearable burdens on the biosphere of which we are a living part, our practices are also crucial in changing our situation. It is one thing to *know* about the community of life on Earth; it is another thing to *survive* within it. Knowledge is not enough; in order to live sustainably within the Cosmos and the community of life, we need to learn how to practice differently. And this is the challenge for education: to transform our existing practices to produce and reproduce sustainable ways for human beings to live within the community of life on Earth, not above or against it.

We also need to cast a critical eye over our current practices of education. How is it that our current educational practices have in fact transmitted knowledge about the eco-crisis while, at the same time, inoculating people against taking sufficient action to avert the crisis (see also, Kemmis & Mutton, 2012)? Somehow, educators thought schools were doing the right thing, teaching about the environment, but they did so in ways that also enabled people to acquiesce to the insufficient actions of many governments on the issue. Despite scientific consensus about the nature and causes of the climate crisis, our educational processes have somehow permitted many people to tolerate climate denialism as if it were a justified perspective that could legitimately stand in the way of action to address the crisis.

What is missing from this paper is how these problems cannot be grasped as decontextualised phenomena. Learning to live with the crises certainly requires different changes depending on the context and the learners. Our practices are rooted in the past and oriented towards the future (Schatzki 2010, 104), and this memory 'encapsulates the history of the happenings of the practice' (Kemmis et al., 2014, 31). As practices have a history, so too do people bring their embodied histories into practices, that is, their historically formed, diverse ways of being and acting in the present. Space does not allow us to elaborate on this more, but we note that changing educational practices requires attention to the diversity of sites and people within them (see Kaukko & Wilkinson, 2020; Kaukko, Mahon & Francisco, 2020, for more discussion)

As historical circumstances change, education has always evolved to reproduce some aspects of societies and to transform others. New ideas are introduced in curricula; new ways of working are enshrined in pedagogies; new forms of assessment produce different kinds of qualifications for different kinds of tasks and different kinds of social relationships. The substance and forms of new educational practices are altered to pursue new educational goals

and ideals. They are always contested, of course, by those who cleave to a passing establishment, those who proclaim the virtues of the new, and those who work assiduously to secure their own self-interests while the new forms of education struggle to be born.

Worldwide responses to the Coronavirus have demonstrated that vast upheavals of existing arrangements are feasible, after all. But how do we world citizens – and citizens of our own countries – put together new kinds of culture and discourses, new kinds of economies, and new kinds of societies and politics, from the remnants of the structures that held the world and our nations together last year? Many governments, and political parties, will almost certainly attempt to restore the *status quo ante* – the way things used to be. They will thus act conservatively (no matter their political stripe) to restore what can be restored without a new vision of how things might be. Their visions of the future are already frozen in the policy platforms they adopted in the past, and they are adapted to a world that no longer exists in the same form.

Yet we educators are in a moment pregnant with possibility. We can help to usher in new worlds, but if we do not, we will likely restore the unsustainable world that was, not only at the cost of human generations to come, but also at the cost of millions of other species on which we and they depend.

There is an urgent need to begin the task of reconstructing education to address, and bring us through, the crises that now confront us. We need urgently to develop forms of education for cultural, economic, environmental, and social reconstruction – at every level from pre-school to adult education. New forms of education will be needed not just in ecological studies, but in every subject and discipline, in training for all occupations and professions. And every educator is needed to join this educational movement for our times; it is a shared task for every educator; and a shared task for the education profession as a whole.

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