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## **Imagination, Science and Education: How to liberate ourselves from the prison of rationality and create a secure future for humanity**

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### **Abstract**

*Achieving Human Security For All (HS4A) is a process that depends on our ability to imagine a future state that is different to present conditions, under which HS4A remains elusive. Only a very few eminent thinkers have recognised, however, that imagination is its own unique and important noetic or cognitive function independent of rationality, giving us access to an ontological sphere that otherwise remains closed to us. Meanwhile, for rationalist science philosophy, which has dominated our education systems since the Enlightenment period, imagination has long been understood as nothing but a preoccupation with the unreal, the mythic, the marvelous, the fictive, and fanciful—entertaining perhaps, but of no serious consequence. In this paper, I argue that rationalist modernism, along with a mass education system designed in keeping with this modernist ‘spirit of the times’, has led to our collective imprisonment within the real, the concrete, and robbed us of the capacity to reflect and transform ourselves and our relationship to the world and each other. This state of affairs will ensure humanity’s rapid demise given the mounting security challenges we now face, that is, unless we can reinstate the faculty of imagination within scientific epistemology and in education, and thus escape our entrapment.*

### **1. Introduction: Imagination as a Key to Understanding Consciousness and Action**

Henri Corbin is one of a very few western thinkers who never tired of reminding us of a self-imposed poverty in our present civilisation.<sup>†</sup> He notes that,

*“western philosophy... drawn along in the wake of the positive sciences, has [long] admitted only two sources of Knowledge. There is sense perception, which gives the data we call empirical. And there are the concepts of understanding, the world of the [rational] laws governing these empirical data.”*

\* Prof Reuter’s research is supported by the Australian Research Council.

† Henri Corbin (1903-1977) was Professor of Islam & Islamic Philosophy at the Sorbonne in Paris and at the University of Teheran. In addition to his outstanding contribution as a scholar of Shi’ite Islam, he was the first French translator of Martin Heidegger and Karl Barth. He introduced the concept of the *mundus imaginalis* into contemporary thought and his work has provided much of the intellectual foundation for archetypal psychology as developed by James Hillman. There are many parallels between Corbin’s *mundus imaginalis* and Carl Jung’s understanding of the collective unconscious as the objective world beyond the reach of rational consciousness.

As Corbin further notes, however, there is also,

*“Active Imagination... [which has] its own noetic or cognitive function, ...[that] gives us access to a region and a reality of Being which without that function remains closed and forbidden to us... [and] whose disappearance brings on a catastrophe of the Spirit” (Corbin 1989:1-2).\**

Corbin’s understanding of the ‘active imagination’ is difficult to grasp because it has so few cognates in western thought, with the exception perhaps of the concept of *imaginatio vera* or ‘true imagination’ in the work of Paracelsus. It resonates more easily with the notion of *kalpana* or ‘creative imagination’ in Indian Vedanta philosophy, wherein it is seen as the ‘world creating faculty of the mind’ (Skt. *manahkalpitajagat*).

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*“A vivid imagination is the best insurance against unintended outcomes because it reveals what really matters and must be prioritised. Nothing matters more than human security.”*

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For Corbin, the imagination is what enables us to create our own future, as well as providing access to parallel dimensions of reality and associated theophanic (spiritual) human experiences. There is of course the more modest and uncontroversial argument of phenomenology, which rightly reminds us that our experience of the mundane world does not emerge directly from the data provided by our sense organs, but that mundane experience too is a product of an ‘imaging’ process—a cognitive process of mental image formation, followed by rational understanding. How are we to understand the other, ‘imagining’ function of the mind, however, which Corbin alerts us to? From where does creative imagination arise if not from sense data, and how does it relate to the rational faculty, the dominance of which—I shall argue—has led to the current, late modernist malaise in science and education? These questions are the central focus of this paper.

This paper proposes that ‘image formation’ is the foundation of all conscious and meaningful subjective experience in animals and in humans. Furthermore, that there are two kinds of images, those ‘of’ the past (which includes images of the so-called ‘present’ that are in actual fact only images of the extremely recent past) and those ‘for’ the future. Such temporally bidirectional image formation lies at the heart of conscious experience, which thus can be characterised as a bidirectional engagement with the stream of events across time. Rationally interpreting the sequence of images we have seen at different times in the past and creating never before seen images of the future through imagination are both vital functions—for the everyday subjective experience of change and for the coordination of

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\* Corbin, Henri 1989. ‘Towards a chart of the imaginal.’ Prelude to the 5th printing of *Spiritual Body & Celestial Earth: From Mazdean Iran to Shi’ite Iran*. Princeton: Princeton University Press, pp. 1-8. First edition 1977.

action respectively.\* The two functions are balanced in a healthy human being, I argue, while a lack of future-directed imagining leads to an entrapment in the past.

Entrapment in the past is not just a ‘catastrophe of the Spirit’, as Corbin has suggested, but it is also a most profound security risk. As living beings, we are immersed within a world whose most fundamental feature is change. In a world where nothing remains the same, human security is a moving target and not a fixed state. Security is an emergent property because our survival is contingent on an intelligent, adaptive relationship with the environment of which we, like all life, are a part. On a more concrete level, this means that we must monitor change and draw rational conclusions, but we must also act. Action, however, takes place on the basis of our ability to project ourselves into imagined future states that lie beyond sensory perception.

Values come into play here because the evaluation of a future state as desirable and worth pursuing or undesirable and to be avoided at all cost, and the taking of appropriate action, is necessarily based on what we value. Values may be held consciously in the form of certain normative concepts or, more often, unconsciously in the form of various motivational complexes. In any case, what we genuinely value is revealed in our actions, which are always taken with a particular imagined future outcome in mind.† A lack of imagination is thus a threat to human security also because it is by projecting ourselves into utopian or dystopian futures that we are forced to reflect about what really matters. A vivid imagination is the best insurance against unintended outcomes because it reveals what really matters and must be prioritised. Nothing matters more than human security.

## 2. Imagination and Science

Corbin, drawing inspiration from the philosophy of Shi’ite Islam and more specifically from the works of Ibn Arabi, saw the active imagination as a mediator between the rational intellectual world of ideas and the quotidian world of sense perception, and as constitutive of a distinct realm of existence, the *mundus imaginalis* (Corbin 1998).‡ He stresses the complementarity of ‘rational’ and ‘imaginal’ mental faculties in humans. While I recognise the same complementarity, I do not think granting imagination a mediating function between senses and intellect and associating it with an objective archetypal realm of symbols captures very well what imagination does for us from moment to moment. To explore the role of imagination in daily life, and situate it more securely in science, I turn instead to an important and somewhat poorly appreciated piece of behavioural research on the basic mechanisms of cognition; mechanisms that emerged early on in the evolution of life.

The two classes of mental images discussed—past- and future-oriented—correspond to memory-based reason and active imagination respectively, and it turns out that both are vital and very basic cognitive functions. The behavioural researcher’s Alan Baddely and Graham

\* The imagination is vital for envisaging future states and acting in ways to realise or avoid such futures, and in this paper, I largely focus on this vital attribute. Imagination, however, can also be used to create images of a hypothetical past or indeed of other, ‘imaginal’ worlds, as Corbin notes.

† It is beyond the scope of this paper to discuss in detail the relationship between action and values, or even to map out the vast literature available on this topic.

‡ Corbin, Henry 1998. *Alone with the Alone: Creative Imagination in the Sufism of Ibn Arabi*. Bollingen Series, No. XCI. Princeton: Princeton University Press / Bollingen. First published in French in 1958.

Hitch were the first to propose the concept of working memory in the 1970s, inspired by Vygotsky's notion of internalised speech, and hoping to understand what we actually do with the stream of images we perceive in the now, and how such image processing relates to consciousness.\* They built on earlier work, in the 1950s, by the physiologists Erich von Holst and Horst Mittelstaed, which held vital cues.† The latter had made an important discovery about how animals perceive change or motion in the environment, which is something all animals must do in order to stay alive, irrespective of whether they are hunters or hunted. They found that animals continuously create a multisensory mental 'image' of what has been happening just now, store that image, at least briefly, in working memory and then compare it with the next image, created from the split-second processing of what is perceived in the next 'now'. Animals thus create an internal loop through the past with the help of a continuous imaging and image storage function designed to detect change in the environment over time, namely by comparing one image to the next. And by extension, certainly in humans but to a degree also in animals, this process of apperception of images also allows for the rational post hoc analysis of causal relationships within a sequence of events. Without a degree of apperception, sense perceptions would carry no meaning, as the phenomenological epistemology of Husserl and Schuetz similarly notes. In the words of Schuetz (1945:535), "meaning [...] is not a quality inherent to certain experiences emerging within our stream of consciousness but the result of an interpretation of a past experience looked at from the present Now with a reflective attitude."<sup>‡</sup>

Why would that be? Put simply, attributing meaning and conducting rational causal analysis would not be possible without the ability to detect the change between images over time. We live in a relational world, and cognition is designed to map, rationally interpret, evaluate, and imaginatively engage with such a world.

Together the imaging techniques of conscious beings such as animals and humans identified by Holst and Mittelstaed are known as 'afference copy mechanisms', and the specific mechanism concerned with storing observations of the outside world and thus creating a loop through the past is called 'ex-afference'. You could say that ex-afference is what gives us the impression of a passage of time that lies behind us. Our memory of the past helps us notice when something new appears, a new sight, sound, or smell that could indicate a risk to our security or an opportunity to become more secure.§ Furthermore, the cognitive function of ex-afference resonates strongly with the basic procedure of science: new empirical observations are evaluated against an earlier description or model of reality, and thus the model is continuously adjusted or updated. This is also how we instruct students to use the scientific method.

\* Baddeley, Alan D. & Hitch, Graham 1974. Working Memory. In G.H. Bower (ed.), *The psychology of learning and motivation: Advances in research and theory* (Vol. 8). New York: Academic Press, pp. 47-89.

† Holst, Erich von & Mittelstaedt, Horst 1950. 'Das Reafferenzprinzip.' *Naturwissenschaften* 37, 464-476.

‡ Schuetz, Alfred 1945. 'On Multiple Realities.' *Philosophy and Phenomenological Research* 5(4):533-576. Published by International Phenomenological Society, online at <https://www.jstor.org/stable/2102818>

§ In human perception vision dominates, but of course we also remember sound, texture, smell and taste. When I speak of 'images' in this paper, it is a simplification for the sake of presenting the argument I make about imagination, and it also serves to highlight the relationship to perception implicitly suggested by the etymology of the word 'imagination'. In fact, however, when I say 'images' I am really thinking of clusters or arrays of multisensory data, irrespective of whether they are images within imagination or memory.

The much overlooked and intriguing matter, however, is that the two physiologists found a second looping process which they called ‘pre-afference’. Apart from the need for registering change, a second problem arises for all animals which their perception must somehow solve: While what an animal does may depend on what it has seen, the image the animal will see next depends on what the animal does. For example, when it moves its head, the image of the world the animal sees will change, even though nothing has moved in the environment. Therefore even simple animals have evolved so-called re-afference mechanisms to predict what image they should perceive in the future as a result of their own action so that this ‘imagined’ image can be compared with what is actually observed by the senses as the action is undertaken. Action would be utterly impossible to monitor and control without this second loop; think of the hand-eye coordination required for catching a ball, for example. A motion in the environment can be detected reliably, even by a subject that is itself in motion, only because the potentially confounding effect of the subject’s own action has been compensated for by creating an imaginary loop through the future.

According to contemporary neuroscience, remembered images are stored in the brain in the non-localised form of neural ensembles, that is, neurons conditioned to fire together. According to the ‘mental synthesis theory’ (Vyshedskiy 2014),\* images of an imagined future state never before seen involve the simultaneous activation of elements of different neuronal ensembles. This act of imaginative ‘mental synthesis’ is coordinated by the pre-frontal cortex, and is aided by differential degrees of myelination, which largely takes place in childhood and makes it possible to temporally synchronise neural ensembles located at different distances from the pre-frontal cortex. How exactly the cortex does this is still being explored (Pearson 2019),† as is the role of the brain’s default system in the process (Raffaelli et al. 2020).‡ It remains unclear, moreover, how the human nervous system evolved from more basic imaginative processes already present in simple organisms, as described earlier. What we do know is that the human ability to imagine is exceptionally strong and is a large part of what makes us human.

The philosophical implications of the re-afference mechanism present in all animals, and of associated higher cognitive functions in humans, have been largely ignored. One partial exception is Paul Ricoeur (1975, no. 9:1),§ whose hermeneutics—opposing Hume—recognises the role of imagination in perception, noting that “we can no longer oppose [...] imagining to seeing, if seeing is itself a way of imagining, interpreting, or thinking.” The action and future-creating function of imagination, however, remains to be fully explored in

\* Vyshedskiy, Andrey 2014. ‘The Mental Synthesis Theory: The Dual Origin of Human Language.’ In Erica A. Cartmill, Seán Roberts, Heidi Lyn & Hannah Cornish (eds.), *The Evolution of Language*, Singapore: World Scientific, pp. 344-352.

† Pearson, Joel 2019. ‘The human imagination: The cognitive neuroscience of visual mental imagery.’ *Nature Reviews Neuroscience* 20:624–634.

‡ Raffaelli, Q., Wilcox, R., & Andrews-Hanna, J. (2020). ‘The Neuroscience of Imaginative Thought: An Integrative Framework.’ In A. Abraham (ed.), *The Cambridge Handbook of the Imagination*. Cambridge: Cambridge University Press, pp. 332-353.

§ Ricoeur, Paul 1975. ‘Lectures on Imagination.’ Transcript of a series of lectures, delivered by P. Ricoeur at the University of Chicago in 1975, produced by the Document Technology Centre, University of Pittsburgh School of Law, in 2005.

philosophy.\* While ex-afference evolved into a higher function of memory-based *rational* analysis in humans, designed for the post hoc ‘interpretation’ of sensory-empirical observations, re-afference evolved into a higher *imaginal* function allowing us not just to monitor external events from moment to moment, but also to plan and monitor action by contemplating the various futures our different optional actions could create.

The creative use of the imaginal function is well-recognised in evolutionary science, however, notably in the context of niche construction. This is a process whereby organisms modify their environment in ways that effectively respond to selective pressures. The human ability for niche creation, more specifically, is unparalleled in its scope and speed, enhanced by our natural capacity for language and symbolic thought (Fuentes 2017).† We can literally see a new niche, a new possibility of being, before setting out to make it real.

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*“We still tend to see the world in this Anthropocene age as an objective natural reality rather than what it really is: the sediment of subjective values and actions.”*

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Cultural systems of knowledge storage (e.g. in writing) and knowledge transfer (training and education) arose from and enhanced this ability, allowing us to accumulate and share a vast store of ideas based on past experience. It further allows us to jointly imagine a desired future state and coordinate collective actions by which we shape the environment gradually to realise that future, or to avoid undesirable futures. Scientific creativity and technological innovation are part of this cultural system, and are all reliant on imagination much more than we give it credit for (Polanyi 1966).‡

### 3. The Current Crisis as a Lack of Imagination

Admittedly, we do not always foresee or intend all of the consequences of our actions. Whenever we do realise that our actions are leading to an undesirable dystopian future, however, it certainly is possible to change patterns of action (behaviour) that were informed by limited past experience, obsolete scientific paradigms, or by dysfunctional education systems. Human security depends on it.

It is all the more curious, therefore, that contemporary humanity should be so unable to collectively imagine a positive, desirable future and to act accordingly in the present. If

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\* Van Leeuwen (2016) and Nanay (2016) have begun to explore the link between imagination and actions but do not look deeply into the epistemological relevance of imagination. They focus on decision-making and, somewhat similar to my argument, do suggest imagination helps us to explore the probability and value of actions’ possible outcomes, but do not seem to recognize imagination as a necessary precondition for action. See Nanay, Bence 2016. ‘Imagination and Perception.’ In Amy Kind & Peter Kung (eds.) 2016, *Knowledge Through Imagination*. New York: Oxford University Press, pp. 124–134; and Van Leeuwen, D.S. Neil 2016. ‘The Imaginative Agent.’ In Amy Kind & Peter Kung (eds.) 2016, *Knowledge Through Imagination*. New York: Oxford University Press, pp. 85–109.

† Fuentes, Agustín 2017. *The Creative Spark: How Imagination Made Humans Exceptional*. New York: Penguin Random House.

‡ Polanyi, Michael 1966. ‘Creative Imagination.’ *Chemical & Engineering News* 44(17): 85–94,104.

our current actions are transgressing planetary boundaries and leading to ecocidal and self-annihilating outcomes, as they evidently are,\* why do we persist with our destructiveness? Why are we so powerless to imagine and commit to creating a future world wherein the planet's predicted peak human population of ten billion people will be secure and prosperous? Achieving this outcome, admittedly, is no mean feat on a practical level but reason tells us it is feasible.† The major cause of our failure so far to enact a secure future is rather that we have failed to do justice to the second and complementary 'imaginal' function of the subjective mind, which has a crippling effect on our capability to act creatively on a collective level, though of course there is a small minority of highly imaginative people. This crippling effect of an undeveloped imagination, based on its dismissal by modern rationalism as something fanciful, unreal and unimportant—is replicated in each generation as children fall into the clutches of a modernist system of education with an over-emphasis on rationalist objectivism. We thus suffer a self-objectification or, in other words, an entrapment in the manifest reality of the past.

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*“We must remind ourselves that we are creators, and that successful and responsible action is not just about science and technology but about the conscious application of values and holistic wisdom to anticipate and avoid unintended consequences.”*

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For the sake of simplicity, I would like to rename the two afference operations of the nervous system that give temporal depth to our inner experience as retrospective 'imaging' and prospective 'imagining', and the associated higher cognitive functions as rational and imaginal. All experiences that we 'image' and store are of the objective past (apperceptive interpretations of objective sensory or instrumental data), whereas 'imagining' is about creating virtual images that are not observations at all, but part of an inner stream of projections of possible future states reflecting the expected differential impact of our actions as subjects. The future is a result of our active engagement with the environment and each other, and what future we want is a matter of individual (subjective) as well as cultural (intersubjective) values.

Modernist rationalist science has serious difficulties accommodating the 'futuring' and 'world-making' imaginal function within its objectivist worldview, often seeing it as the realm of phantasies and falsehood and thus unrelated to reality. The consequences of this failure to remember that, from the beginnings of the human journey and ever increasingly so, we are inhabiting a world created by ourselves, are devastating. We still tend to see the world in this Anthropocene age as an objective natural reality rather than what it really is: the

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\* The concept of 'planetary boundaries' is based on the work of researchers at the Stockholm Resilience Centre, see <https://www.stockholmresilience.org/research/planetary-boundaries/the-nine-planetary-boundaries.html>

† See for example: Flannery, Tim 2020. *The Climate Cure: Solving the climate emergency in the era of COVID-19*. Melbourne: Text Publishing.

sediment of subjective values and actions. And unfortunately, this hyper-realist objectivism is deeply entrenched within and reproduced by our flawed, modernist systems of education. In the absence of a more appropriate pedagogy, we cannot fully develop our individual capacity to imagine—much less our ability to collectively imaginative and shape the future together, through a common vision and social collaboration, at the next higher level of complexity that is now urgently called for.

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*“Children’s imagination must not be disciplined into silence but developed to become a force for active, conscious and responsible creation.”*

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#### **4. Modernist Education and the War Against Imagination: A Personal Perspective**

When I was about 4 years old, I made an observation that filled me with trepidation. In those days, most children grew up in small communities or neighbourhoods where preschool children of different ages socialised together, largely in the absence of adult supervision and free of the influence of ‘early education’ institutions. At that time, I observed how my slightly older friends, who had commenced school at the age of six years, came back transformed in a most horrifying way. Having been ‘disciplined’, trained to sit still and forced to renounce so-called magical thinking, they became unable to engage in imaginative play. They seemed somehow dead inside. “School must be a truly evil place,” I concluded, and when I was forced to enter that place myself, I entered it as one would enter a battleground, ready to fight for my life. I was determined not to let anyone beat my creative freedom of imagination out of me. And yes, my resistance was certainly noted and often sorely tested. School, I concluded, was a place for turning lively children into passive memorizing machines, whose minds were being stuffed with non-debatable facts about a non-debatable ‘reality’ determined by objectivist science. They also were trained to be the obedient citizens of a modern society that had no time for individuals with waking dreams, but at the same time was heedlessly unleashing its own unconscious dreaming, and in the course of that, was manifesting a future wherein everything everywhere was brutalised and trampled in the name of progress, from the last vestiges of healthy ecosystems, sustainable traditional food systems and community life in the region where I grew up to the bull-doing of tropical forests in distant lands. Everywhere I looked I could see evidence of the inhumanity and violent destructive character of modernity, with the brilliant clarity of unbiased seeing given to children. I could also see clearly that people created this reality with their choices, that it was not inevitable, “a price to pay for progress”, as many of my teachers claimed. And I can still see that now. I survived education.

Much later, during my higher tertiary studies at honours and PhD level, creativity and imagination were suddenly expected of me and appreciated. Luckily, I had held on to it, and how nice for it to be appreciated at last! By the same token, it much saddened me to

observe, a few years later again, how many of my PhD students were harbouring a deep-seated fear that they would be penalised if they showed much creative imagination. It took a year of regular personal mentoring conversations to convince them that imagination is indeed a scientist's best friend.

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*“Whatever our future will be individually, or nationally, it will be necessarily embedded in a wider social and global context.”*

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The backroom status of imagination in science is also evident in the way science rewards its own. For example, when a Nobel Prize is awarded, the focus is on the real, the object of study, the aspect of reality uncovered by the award-winning research. Only in retrospect and as an aside do we acknowledge the creative subject, the imaginative powers that characterise the most path-breaking scientists, and more rarely still, the special circumstances that may have led them to develop such imaginative powers. And when we do ask, it often turns out that highly creative individuals like Alfred Einstein or Nicola Tesla, or Alfred Nobel himself, were often rather eccentric individuals,\* dreamers, misfits even—in short, survivors of education.

## 5. Secure Human Futures: How to Develop Imagination in Science and General Education

Our senses are great at telling us what is, out there and equally within our own body. Reason is great at analysing post hoc how elements of the world relate, the order of things, and reality as it is. But it is imagination that helps us picture and choose between different futures, which also entails a recognition of the fact that the past could have been different. Imagination is thus also a prerequisite of critical historical consciousness. Reason remains tied to what was, the truth, the manifest state of nature. The exclusive worship of reason, however, has led us into an entrapment within a kind of hyperrealism: ‘Hyper’ in that we tend to forget that this ‘real world’ we inhabit is in fact a world created by an inner act of apperceptive interpretation, and also one that has been shaped physically by the cumulative impact of past actions by sentient beings, particularly humans, upon the environment.

This risk, of forgetting our own freedom and responsibility as creators, was once better known than it is today. We would do well, for example, to recall the ancient dictum *Sicut hic mundus creatus est*, which is mentioned in the ‘Emerald Tablet’ (or *Tabula Smaragdina*), a 2<sup>nd</sup> century alchemical text.† Or, in Henry Corbin’s words,

*“we live in a scientific civilization that is extending its control... even to images. It is commonplace today to speak of a “civilization of the image” (thinking of our*

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\* Alfred Noble blew up his own laboratory in his quest to develop dynamite, but his willingness to make mistakes and learn from them eventually led to success.

† Steele, Robert & Singer, Dorothea W. 1928. ‘The Emerald Table.’ *Proceedings of the Royal Society of Medicine* 21: 41–57 & 485–501.

*magazines, cinema, and television). But one wonders whether [...] this does not conceal a radical misunderstanding [...] For instead of the image being elevated to the level of a world [...] there is [...] a reduction of the image to the level of sensory perception pure and simple, and ...the more successful this reduction is, the more the sense of the imaginal [the creative faculty of imagination] is lost.” (1964:8)\*.†*

We have lost and must remind ourselves that we are creators, and that successful and responsible action is not just about science and technology but about the conscious application of values and holistic wisdom to anticipate and avoid unintended consequences. Imagination needs to be reinstated and properly understood as the faculty of higher-order thinking par excellence, and some steps have been taken in this direction. A beginning was made with the demise of a behaviourist paradigm in psychology, which for decades had portrayed human action as determined solely by external inputs and thus prevented any serious consideration of the imagination as a cognitive faculty (Perkins 1981; Hunt 1982).‡

There is some truth in the biblical claim that we humans were “created in the image”, for indeed, such is the nature of the human mind. We are not knowers of images, but also image creators, and world makers—for better or worse. Imagination is the creative spark in us, and to recognize it is to recognise ourselves once more as moral subjects, as creators, as makers of images and of new worlds. Imagination is the mental loop into the future that makes conscious action possible. It is so fundamental that it defines us, and in its simplest form, it is present in all sentient life.

We thus do not need to learn imagination. Nor can we exist without it. The problem is rather that the imaginal faculty is poorly developed in many people so that they find it difficult to contemplate the prospect of a systemic transformation toward a ‘new world’, which we now need to imagine and create if human security is to be improved or even maintained at the present level.

On a practical level, here is one recommendation for educators. I noted earlier that Ph.D. students are expected to be creative, imaginative, and to break new ground in their projects. This suggests that one way to change earlier stages of education would be a shift away from canonical learning to more explorative, open-ended project work. The kind of projects I am thinking of do not come with a right or wrong answer, the outcome is not known in advance, even by the teacher. An exploratory project, rather, is an open-ended process of creative discovery, though it may also entail observation, trial and error. Such a pedagogical approach is currently largely confined to the teaching of art and design but should become part of every educational endeavour. Children’s imagination must not be disciplined into silence but developed to become a force for active, conscious and responsible creation, a loop into the future from within the now.

\* Corbin, Henri 1964. ‘Mundus Imaginalis.’ *Cahiers Internationaux de Symbolisme* 6:3-26, Brussels 1964. Based on a paper delivered at the Colloquium on Symbolism at the Sorbonne in Paris in June 1964.

† In Corbin’s terminology, ‘imaginal’ refers to what I call ‘imagining’ – the creation of never seen images, as opposed to the mere ‘imaging’ of perceived visual data.

‡ Perkins, D.N. 1981. *The Mind’s Best Work*. Harvard University Press; and Hunt, Morton M. 1982. *The Universe Within: A New Science Explores the Human Mind*. Brighton (UK): Harvester Press.

In order to reinstate imagination in education, learners need to be provided with an environment rich in opportunities to exercise their imaginal faculty, as well as opportunities to learn how to share our personal imaginings with others. Children and young people generally delight in the imaginal exploration of future possibilities. It is not simply about personal futures, however, for which we have established procedures of vocational advice, but about learning to imagine shared futures together within moral and conscious communities of actors. Whatever our future will be individually, or nationally, it will be necessarily embedded in a wider social and global context.

A well-developed imagination is one that takes wider concerns into consideration, and thereby becomes inclined to choose a future that brings security to all, not just some. This is quite the opposite to the dominant paradigm of political realism that has been defining security as a zero-sum game, with often devastating consequences. Instead, a developed imagination is cognisant of interdependence and thus naturally follows the principles of the United Nations Development Programme's Human Development Report of 1994, which defines human security as "freedom from want" and "freedom from fear" *for all persons*.\*

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\* <https://hdr.undp.org/content/human-development-report-1994>