



Children's Education, Institutions of Learning, Technology and Wisdom Inquiry: Global Challenges and Methodological Perspectives

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Abstract

This paper is about the rationality of *methodological variance*, where changes in method and methodology of science may be warranted/triggered by the urgency of finding alternatives to the methodology currently in fashion that *fails* to address the relevant and pressing problems (Pandit 1983, 1991, 1996, 2002a, b; Pandit and Dosch 2013). It deals obliquely with Maxwell's (2010, pp. 667–690) *criticisms* of Pandit (2010a, b), offering only a bare sketch of appraisal of his methodological proposals of AOE, AOR and WI, not only as going *beyond* SR but as better alternatives to dominant methodologies such as that of Karl R. Popper (1934, 1945, 1957, 1959, 1963, 1969, 1972, 1974, 1975, 1977, 1982a, 1982b, 1983 and 1994), *without* rehearsing or recycling Maxwell's well-known arguments in great detail (Maxwell 1974, 2004, 2005, 2009a, 2009b, 2010, 2014, 2016a, b, 2018, 2019). More importantly, how these proposals improve upon the eighteenth century Enlightenment idea of learning from scientific progress *how* to achieve social/cultural progress towards an enlightened world (Maxwell 2009a, b), i.e., a world that is sensitive to *problems* of living and human well-being, is discussed. Having dealt with such problems in Pandit (1995, 2005, 2006a, b, 2007a, b, c, 2008, 2010a, b, c, 2012, 2013, 2014, 2015, 2016a, b, 2017b), the present appraisal is limited to *the rationality of understanding, or better of rethinking, academic inquiry within the wider contexts and reaches of wisdom inquiry*, with particular reference to the pressing global problems including those problems that are traceable to ETS progress, which is itself often found to violate the principle of interconnectedness across nature (Pandit 2001, 2006b, 2012, 2016a, 2016b, 2017b).

The paper is dedicated to the *Memories* of Dhanai Shobhawati Pandit, Chuni Lal Pandit, Roshan Lal Pandit and Pushkar Nath Pandit. Full of invisible pain, their life was *tragically* cut short due to their forced migration following the violent uprootment and attempted genocide (1989-1990) of Kashmiri Pandit Community in their ancient homeland Kaschmir.

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Abbreviations

SE	Standard empiricism
AOE	Aim oriented empiricism
AOR	Aim oriented rationalism
WI	Wisdom-inquiry
KI	Knowledge-inquiry
PAMS	Progress-achieving methods of (natural) science
STS	Science and technology studies
ETS progress	Economic, technological and scientific progress
AIMs	Artificial intelligent machines
R&D policy	Research and development policy
ECS	Ethics consultation service
GHG	Green house gas
SDGs-2030	Sustainable development goals 2030

“Science needs to be set within the framework of the pursuit of *wisdom*, definitely not, primarily, a scientific enterprise (not even the enterprise of acquiring *knowledge*).” - Maxwell 2010, p. 688.

“The obligation - to keep in mind the unavoidable connection or interplay between *all* actions - will set and should set limits to our blind confidence in science and technology, but not necessarily to science and technology itself. The solution of ... problems requires a great effort, perhaps a rather radical change (Heisenberg 1989, p. 494)”. – Transl. and cited in (Pandit 1995, pp. 67-68).

“The lover of wisdom, the philosopher, desires and seeks wisdom but does not possess it.” – Socrates

1 Another Look at Aim Oriented Empiricism¹

In this section and the following three sections (2–4), I want to critically appraise Nicholas Maxwell’s argument for an academic revolution in the universities and institutions devoted to learning, a revolution all-embracing enough to enable us all, *concerned* about the global challenges, to rethink not only *science* but STS and ETS progress (Maxwell 2004, 2009a, b, 2010, 2012a, b, 2014, 2016a, 2016b, 2018, 2019). In the sections 5–6, I want to raise the following question while considering some of the critical reflections of Maxwell on fundamental issues related to the methodology of science itself (Maxwell 2010, 2012a, b, 2014):

What improvements, if any, have been made by the philosophers of science on Karl Popper’s pioneering articulation of scientific rationality (Popper 1934, 1945, 1959, 1963, 1972, 1974, 1994)?

In sections 7–8, the urgent need for academic inquiry to change its (dis)course in a globally relevant, and revolutionary, manner so as to address the fundamental problems about the education and well being of children, and education and research in general, is discussed with reference to Maxwell (2014). *Arguably*, wisdom inquiry (WI) and moral progress are the two intimately related frontiers of research. In the concluding section 9, I pose the most fundamental, though neglected, problem of the possibility of *moral progress*:

When can we view any form of progress mankind makes, or is capable of making, as a step towards moral progress in solving the problems of living and well-being, over and above ETS progress?

Thus, *indicators* for evaluating moral progress and distinguishing *it* from ETS progress are discussed.

Taking his recent views (Maxwell 2014, 2016a, 2018, 2019) into consideration, my appraisal of Maxwell’s methodology of science will focus on the following questions:

- (i) How admirably does Maxwell not just defend but carry forward the normative task of philosophy “to keep alive awareness of what the humanity’s most fundamental, important, urgent problems are, what our best attempts are at solving them *and*, if possible, what needs to be done to improve these attempts”?
- (ii) How best can we explicate the problematic concept of knowledge itself? How far can AOE, AOR and WI be seen as tending to converge on the unconventional

¹ In his “Reply to Comments on *Science and the Pursuit of Wisdom*”, Maxwell (2010, pp. 684–690) pointed out that the questions that had been raised in (Pandit 2010a, 2010b and Pandit 2008) had remained unanswered. These questions concerned Maxwell’s AOE, AOR and WI, i.e., the improvements these may be said to introduce over Popper’s methodology of science, in particular over Popper’s view of the development of physical theory and the role metaphysical research programmes play in science (Popper 1982). Without rehearsing here the details of the discussion in (Pandit 2010a, pp. 649–666; Pandit 2010b, pp.30–37; and Pandit 2007a, pp. 28–32, 2008, pp. 4–9), Maxwell’s (2010) clarifications and criticisms are taken with high admiration, in the best traditions of philosophical dialogue, no matter how confusing or wrong the questions raised in (Pandit 2010a) may have been.

- view that knowledge is a context-dependent resource that can be developed and used more *wisely* if pursued and produced within the wider framework of *wisdom inquiry* (Pandit and Dosch 2013; Pandit 2016a, b; Pandit 2017a; Pandit 2019a)?
- (iii) As a corollary of (ii) above, how far does Maxwell’s defence of natural philosophy succeed not only in improving upon Popper’s philosophy of science – particularly on Popper’s view that science aims at truth – but in articulating the rationality of science, in a more enriching way, in terms of *its* highly problematic aims? Since AOE, AOR and WI seek to reconnect philosophy with science, on the one hand, and science with the wider framework of the problems of living, on the other, reminding us of those problems to which Popper (1994) had *returned back* shortly before his death in September 1994, how best can we answer the question (iii) above?
 - (iv) How fundamental are the questions and tasks that Maxwell (2014) discusses in his recent book ‘Global Philosophy – What Philosophy Ought to Be’?
 - (v) How can the rationality of AOE, AOR and WI be understood in terms of the idea of making the methodology of science sensitive to relentless improvements by *methodological variance* (Pandit 1991; Pandit and Dosch 2013)?

According to AOE, there are “problematic metaphysical assumptions inherent in the aims of science”, i.e., the metaphysical hypotheses of physics. In order to keep improving them, AOE represents them as forming a hierarchy of hypotheses, as is depicted in Maxwell’s hierarchical diagram of the methodological rules, going up from level 1 to the level 7 (Maxwell 1974 and subsequent work; Maxwell 2014). Going beyond standard empiricism (SE), Maxwell’s discussions of AOE and wisdom inquiry (Maxwell 2004, 2009a, 2009b, pp.1–56; 2010, 2014, 2016a, 2018, 2019) call for a new conception of science: “We need a new conception of science which represents the metaphysical hypotheses of physics in the form of a hierarchy of hypotheses, as one goes up the hierarchy hypotheses becoming less and less substantial, and more nearly such that their truth is required for science, or the pursuit of knowledge, to be possible at all. In this way we create a relatively unproblematic framework of hypotheses, and associated methodological rules, high up in the hierarchy, within which much more substantial and problematic hypotheses, and associated methodological rules, low down in the hierarchy, can be critically assessed and, we may hope, improved in the light of the empirical success they lead to and other considerations (Maxwell 2014, pp. 92-93).”

The most important task of the philosophy of science is to keep exploring how best to improve the methodology of science, or the PAMS, and how best we can learn from the PAMS *how* to make progress in other areas of human life (Maxwell 2016a) where it is urgently needed. Of particular importance is the following methodological rule:

“...in order to be acceptable, a fundamental physical theory must be (sufficiently) unified. It is the persistent acceptance of unified theories only, when endlessly many empirically more successful disunified rivals are available, that commits physics to the metaphysical presupposition that, at the very least, the universe is such that all disunified theories are false. Recognition of this point constitutes the key step towards adopting the hierarchical methodology of AOE (Maxwell 1974 and subsequent work)”.

AOE has implications for a revolution in the aims and methods of academic inquiry so that it may become rationally organized and devoted to helping humanity solve global problems and make progress towards a wiser world. That is to say,

“We urgently need to bring about a revolution in science, and in academia more generally, so that the basic task ceases to be merely expert knowledge, and becomes rather that of helping humanity learn how to make progress towards a better world” (Maxwell 2019, Preface).

2 Pursuit of Knowledge without Standard Empiricism

At the very outset, let me first underline some of the most important aspects of Maxwell’s methodological moves that go beyond SE. *First of all*, Maxwell’s methodological moves are directed *against* SE, an orthodox philosophy of natural science, at the centre of KI, held by philosophers and scientists equally. SE holds, *first*, that the basic aim of science is knowledge of truth; *second*, that the basic method of science is to appraise its theories in light of relevant bodies of empirical evidence; and, *third*, that nothing can be accepted as part of scientific knowledge independently of empirical evidence. One may illustrate this view with reference to Popper (1963, 1972). Although Popper departs from the orthodox conception of science in his view that scientific knowledge is *conjectural* in nature, he embraces SE in advocating that science aims at truth (Popper 1963, 1972; Pandit 1983, 1986, 1988, 1991, 1994; 2010a, b).

Second, Maxwell argues that SE must be rejected as *false*. Its rejection can be understood in terms of the fact that physicists “only ever accept *unified* theories even though endlessly many empirically more successful *disunified* rivals can always be concocted (Maxwell 2014, p. 164).” That is to say that “science makes a big, permanent, and highly problematic assumption about the nature of the universe independently of empirical considerations and even, in a sense, in violation of empirical considerations—namely, at the very least, that the universe is such that all grossly *disunified* theories are false. Without some such presupposition as this, the whole empirical method of science breaks down (Maxwell 2014, p. 164).” Thereby, the physicists “make the assumption that there is some kind of underlying unity in nature, whether they acknowledge this or not” (Maxwell 2014, p. 165; see also Maxwell 2018, pp. 4, 83, 86–87, 93–98, 164)).

Third, the basic task of academic inquiry/philosophy, argues Maxwell, *should be* the articulation of the most fundamental problems of living and relentless search for improvement in our attempted solutions of these problems. As is expected, these problems do not include the puzzle-solving analytical tasks in which the analytic philosophy – i.e., philosophy in the twentieth century analytic tradition – still engages itself (Maxwell 2010, pp. 668–670; Maxwell 2014). In this context, it is important to recognize, or diagnose, how it is KI, as built into the institutional structure of academic inquiry, which is grossly ‘irrational’, being partly responsible for the rise of current global crises and our incapability to solve them (Maxwell 2010, p. 669; Maxwell 2014). From the past we have inherited *academia* organized around KI, which is the view that, *first*, knowledge has to be acquired; and *then*, secondarily, it can be applied

to help solve social problems (Maxwell 2014, p. 98): “We urgently need to bring about a revolution in academic inquiry so that the basic aim becomes wisdom, and not just knowledge (Maxwell 2014, p. 98).”

Fourth, it is the methodological use of science, over and above its widely recognized cultural and practical value, via ETS progress, that needs to be recognized in the larger and wider contexts of problem-solving (see especially Maxwell 2016a). Thus, in order to implement the eighteenth century Enlightenment idea *properly*, the following three steps need to be got right (Maxwell 2010, p. 671; 2014, p. 116; 2018, pp. 173–187): *First*, the PAMS need to be correctly identified; *second*, the PAMS need to be correctly generalized so that they become fruitfully applicable to any human endeavour, whatever the aims may be, and not just applicable to the endeavour of improving knowledge; and, *third*, the correctly generalized PAMS then need to be exploited/applied correctly in the great human endeavour of trying to make social progress towards an enlightened, wise, civilized world.

Fifth, “Unfortunately, the *philosophes* of the Enlightenment” got all three above steps wrong. They failed to capture correctly the PAMS. “They failed to generalize these methods properly; and, most disastrously of all, they failed to apply them properly so that humanity might learn how to become civilized by rational means ... That the *philosophes* made these blunders in the eighteenth century is forgivable; what is unforgivable is that these blunders still remain unrecognized and uncorrected today, over two centuries later. Instead of correcting them, we have allowed our institutions of learning to be shaped by them as they have developed throughout the 19th and 20th centuries, so that now the blunders are an all-pervasive feature of our world”- (Maxwell 2014, pp. 116–117; also turn to Maxwell 2018, pp. 83–108, 109–170; Maxwell 2019, pp. v–ix, 9–20).

Sixth, the rationale for the institutionalization of wisdom-inquiry, a decisive methodological move by Maxwell, is that STE progress *cannot* provide solutions to all our future problems – indeed, in a sense, cannot provide solutions to *any* problem of living. Wisdom-inquiry stresses that we need to put imaginative and critical exploration of problems of living at the heart of academia precisely because STE progress *cannot* solve all our problems, or, in a sense, *any* of them (Maxwell 2010, p. 687).

Seventh, and finally, “... even within academia, science needs to be removed from its throne of intellectual supremacy, and relegated to a subsidiary, secondary role, the primary academic activity being the non-scientific one of articulating problems of living and proposing and critically assessing possible solutions – possible and actual *actions, policies, political programmes, philosophies of life*, all very different from claims to knowledge, let alone *scientific* claims to knowledge. Science needs to be set within the framework of the pursuit of *wisdom*, definitely not, primarily, a scientific enterprise (not even the enterprise of acquiring *knowledge*). Far from reducing life to science, I argue that life, and the problems of living, are more fundamental than science and the problems of knowledge” (Maxwell 2010, pp. 687–688).

There are a number of *fundamental problems* that need proper diagnoses, more so if we want to understand the rationality of methodological moves of Maxwell, viewed from varied perspectives (Maxwell 1974, 2004, 2009a, b, 2010, 2014, 2016a, 2018, 2019). Being myself an admirer-critic of Karl R. Popper (1934, 1945, 1957, 1959, 1963, 1969, 1972, 1974, 1975, 1977, 1982a, 1982b, 1983; Pandit 1971, 1972, 1976, 1983, 1986, 1988, 1994, 1989, 1991, 1994, 1995, 1999, 2016b, 2019a; Pandit and Dosch 2013) and Maxwell (2004; 2009a, b; 2014; Pandit 2007a; 2008; 2010a, b), the just alluded to *four*

papers were written in an attempt to understand Maxwell's methodological moves, notably his AOE, AOR and, above all, his conception of wisdom inquiry.

The most fundamental problems, that Maxwell's methodological moves *seek* to identify and address, and that *need* to be identified and addressed even for independent reasons, can be formulated as follows. *First*, what are and what ought to be the aims and methods of science so as to improve the problematic yet indispensable metaphysical assumptions in science? In other words, should not the methodology of science itself be taken as a normative discipline, of which the methodological moves, e.g., from SE to AOE to AOR to WI, are a very good example, so as to relentlessly keep improving the methodology of science, including the *aims of science*? *Second*, how far-reaching can the *academic revolution* embracing universities, schools and research institutions be, given AOE, AOR and wisdom inquiry as its main anchor? How best can our institutions of learning, our universities and schools, be rationally so designed as to remain devoted to the task of solving our global problems, notably the problems of living and well-being? *Third*, is not wisdom inquiry, *as it were*, an inevitable consequence of the normative approach to (i) the methodology of science and (ii) the problems of living and human well-being at various levels of diagnoses and analyses? *Fourth*, why it is not so widely appreciated that we can learn from the PAMS how to make progress, beyond SE, in other areas of human life where progress may be urgently needed? Why is there less admiration for AOE and AOR, despite spectacular ETS progress? *Fifth*, and finally, how can science contain the methodological key to wisdom when it is precisely science itself that is behind so many of our current troubles, globally, including anthropogenic global warming-driven climate change (Maxwell 2014, pp. 93, 106, 113)?

3 Rethinking Academic Inquiry in Light of Wisdom Inquiry

The prospects for AOE and AOR, proposed by Maxwell as steps on way to transforming KI into WI, depend on the following conditions being fulfilled. The *first* condition is that it is possible for science to improve its aims, say within AOE, so that it becomes more rational, more responsible and more far-reaching (Pandit 2010b), particularly where problems of living on the one hand and the intended and unintended consequences of science and technology, on the other, are concerned. This does not necessarily imply that science can keep changing and choosing its aims until it is able to reach that stage where it can predict its own transition to proper wisdom inquiry. For, the actual choices with respect to its aims that science makes over time may for ever remain imperfect. The *second* condition is that it is possible to so implement WI, replacing KI in its present sense by redesigning the institutions of academic inquiry, so as to propose those solutions to problems of living and well-being that are *realistic* and that can be successful. Thus, a *successful wisdom inquiry* would most notably include a *reformed/revolutionized* academic inquiry. It would also probably be known by the absence of unintended/undesirable harmful consequences of ETS progress. If the differences between KI and WI were just a matter of degree only, and not of kind, then it would be obviously erroneous to talk of a revolution in academic inquiry. Since their differences are differences in kind, we have to relentlessly ensure that the second condition above can be fulfilled. In the hope of finding our way to a revolution in academic inquiry, it is pertinent to turn to Maxwell's latest views that are admirably

developed in his recent book (Maxwell 2014; turn to sections 7 & 8 below; see also Maxwell 2018, 2019).

I want to suggest here a further significant step in articulating the rationality of AOE, AOR, and WI. Arguably, the goals of a revolutionised academic inquiry, if taken within the wider framework of wisdom inquiry, are better served by regarding *scientific knowledge* itself as a context-dependent resource rather than context-independent unchangeable truth. As a consequence, considered against Descartes' theory of knowledge (Descartes 1628, 1637), we can view *wisdom inquiry* as a new frontier of research that inquires into *its* wise production and wise use for purposes of helping humanity to cope with many of the challenges it faces now and it will certainly face in the future (Pandit and Dosch 2013; Pandit 2013, 2014, 2015, 2016a, b; Pandit 2017a, b; Pandit and Meusburger 2017). As a *caring science*, imagine how much even psychoanalysis could very legitimately contribute by interfacing with wisdom inquiry to serve the larger well-being interests of humanity and of our living planet Earth (Pandit 2019b).

4 From Natural Philosophical Normative Tradition to Aim Oriented Rationalism

One of the most decisive arguments in favour of rethinking academic inquiry so that instead of devoting itself to acquisition of knowledge it devotes itself to learning to make progress *how* to make progress towards a better world that is sensitive to helping humanity solve the problems of living and well-being can be found in Maxwell (2012b, 2014, 2018, 2019), besides his earlier work. As Maxwell puts it: “Judged from the standpoint of helping humanity learn how to create a better world, academic inquiry devoted to the pursuit of knowledge is damagingly irrational in a wholesale, structural way, and this irrationality of our institutions of learning has much to do with the dangerous situation we find ourselves in today. We fail to learn how to make progress towards a better world because our institutions of learning are profoundly dysfunctional intellectually. They have in them blunders inherited from the eighteenth-century Enlightenment (Maxwell 2019, Preface, p. vi).”

In this context, it is necessary to consider when it was exactly that natural philosophy and the normative tradition associated with it died. What was it, moreover, that led to its death? Both these questions derive their importance from the normative tradition of natural philosophy. Answering the *first* question, Maxwell (2012b, p. 707) points out that natural philosophy ‘began to die almost immediately after its birth, as “philosophers” became increasingly remote from the outlook, thought and work of “scientists”’. This process continued throughout the 18th century, and became confirmed in the 19th century. It was in 1833 that William Whewell coined the term “scientist”’. As to the *second* question, Maxwell (2012b, p. 707) holds *two* major factors mainly responsible for leading to its splintering into science and philosophy. The *first* of these has to do with the fact that

“Newton’s ideas about method, as set out in the *Principia*, had an immense impact. Natural philosophers began to take for granted that they had in their possession an assured method for the acquisition of knowledge. This involved basing everything on evidence. Evidence alone provided the means for deciding

what should be accepted and rejected in natural philosophy, or in science as it came to be called, and anything not amenable to empirical testing had no place in science” (Maxwell 2012b, p. 707).

As regards the *second* factor, Maxwell argues that “the failure of natural philosophers to solve the philosophical problems associated with the new vision of the universe associated with the new natural philosophy led to philosophy being developed in ways which became more and more unrelated to, and irrelevant to, science. Attitudes developed in both science and in philosophy intensified the rupture, and tore natural philosophy apart” (Maxwell 2012b).

It is in this context that I find it admirable how relentlessly AOE (Maxwell 1974, 1980, 1984, 2014, 2018, 2019) addresses the following crucial methodological issue:

What are and what ought to be the aims and methods of science so as to improve the problematic metaphysical assumptions in science?

The central argument in Maxwell’s *From Knowledge to Wisdom* (Maxwell 1984) and in (Maxwell 2014, 2018, 2019) takes the reader from AOE to AOR; and then from AOR to wisdom-inquiry, seeking to modify as well as improve upon the basic Enlightenment idea of learning from scientific progress *how* to achieve social progress towards an enlightened world (Maxwell 2009a, 2009b). On the other hand, *it* modifies, or rather improves upon, Popper’s (1934, 1959) argument *from* the deductivist falsificationism to critical rationalism *to* the open society. To quote Maxwell:

‘In order to create a better, wiser world, we need to learn how to do it. That in turn requires that our institutions of learning, our schools and universities, are well-designed, rationally designed and devoted for the task. At present they are not. It is this that is in part responsible for our global problems and our current incapacity to tackle them effectively. We urgently need to bring about a revolution in universities around the world so that they become devoted to seeking and promoting wisdom - helping humanity create a better world. As far as the long term interests of humanity are concerned, there is probably no more important thing that we need to do. Is this academic revolution really needed? What would it imply? What are its advantages and disadvantages? How ought universities to develop? If the revolution is required, what can be done to help bring it about? These are some of the questions STS ought to tackle (Maxwell 2014, pp.107)’.

5 Karl Popper: Wisdom Inquiry and Progress towards a Return to Natural Philosophy

The same kind of question arises with regard to science itself. What is the aim of science? Does science aim at truth, pure and simple, as Popper and others thought (Popper 1963, 1972)? For both Popper and Maxwell the question is important, even if the answers may vary radically, depending upon which philosophy one wishes to advocate. For both of them, philosophy and methodology of science seek rationally to

correlate aims of science with its methods. A properly chosen aim for science is crucial to getting at its methodology, the former serving as a resource for the latter (Pandit and Dosch 2013). Once the methodology of science is in place, the stage is set to extend its main keys to problems outside science, in particular to life as a (problem-solving) whole. The metaphysical assumptions that science makes but hesitates to state explicitly should also be brought within the purview of the generalized methodology. This can be done by stating the assumptions explicitly and clearly. They must then be articulated and criticized according to the generalized methodology. Thus, they may even be replaced by better alternatives.

I want to suggest that in the midst of considerable progress Popper and Maxwell make in the field of the methodology of science we must pay attention to a very important aspect of their methodologies. Quite consistent with Popper's approach, Maxwell has relentlessly been arguing that the most rational way to learning to solve the global problems, challenges and crises confronting the humanity is to learn from the successful solutions that science and technology have been able to find to the problem of understanding the universe. A part of the reason for our failure to solve the former problems - viz., the problems of learning how to become civilized, enlightened or wise – may lie in our failure to use the PAMS optimally elsewhere to solve the problems of living and well-being, among other global problems. This indicates that there is much more that we could still learn, if only we get the PAMS properly into perspective and we take the task of learning from the PAMS seriously. We can learn, for example, according to Maxwell, to improve problematic aims of academic inquiry as we proceed in a vast diversity of contexts.

In a nutshell, if properly implemented, AOE and AOR put the academic inquiry in diversity of contexts on the path of wisdom inquiry with a view to returning back to natural philosophy where universal interconnectedness across nature and among the academic disciplines becomes transparent (Pandit 2015, 2016a, b; 2017b). Science and technology have put enormous power in our hands. Yet the ambivalence of ETS progress has landed the humanity in dangerously explosive situations in which we ourselves are primarily responsible for having caused damage to our planet Earth. This is why it is urgent to bring about a revolution in humanity's institutions of learning, so that humanity may be able to begin to learn how to make social progress towards a better, wiser world. To quote Maxwell:

“Modern science and technology have led to modern industry and agriculture, modern hygiene and medicine, modern armaments, which have led to much that is good but also to population growth, destruction of natural habitats and mass extinction of species, lethal war, nuclear weapons, pollution, and climate change. We urgently need sufficient wisdom to be able to anticipate the emergence of serious global problems due to new actions made possible by science and technology, and take action so as to stop such problems emerging before they become serious. Failing that, we need sufficient wisdom to have the political muscle able to act so as to resolve global problems humanely, effectively, and intelligently. ... But how is humanity to acquire the global wisdom that is required? (Maxwell, 16 Jan., 2019: Open Discussion with Friends of Wisdom (FRIENDSOFWISDOM@JISMAIL.AC.UK).”

It is highly relevant here to mention an important point that we owe to Popper (1963). In the context of the rationality of scientific progress and scientific revolution (Popper 1963; 1975), Popper said that *we* can learn from our mistakes. Popper's critical rationalism generalizes this key idea for the progress of social sciences. The key to *learning from* our solutions to the cosmological problem of understanding the universe - i.e., from our scientific and technological progress - in order to learn to solve the global problems is to learn from our mistakes without which science would not have taken us thus far. Maxwell's idea that we can learn from scientific progress how to make social progress towards a good, civilized, wise world not only echoes but also strengthens Popper's normative methodology further and rightly so.

As I have indicated before, I do think that there has been significant progress from Popper to Maxwell that deserves serious attention. This is itself a good reason to answer the questions I may have left unanswered earlier in (Pandit 2010a, b). Towards this end, in what follows, I shall defend the following thesis: that there are strong points of *continuity* between Popper and Maxwell and yet there is considerable progress and improvement which Maxwell's methodology introduces over that of Popper (Pandit 2010b, p.33; see also Pandit 2007a)".

6 Normative Turn of Wisdom-Inquiry: A New Frontier

Maxwell (2014, Chapter 5; 2019, pp. 31–32), restates where exactly his major differences with Popper's philosophy of science lie. Let us briefly take a look at Popper's views (Pandit and Dosch 2013). *First*, Popper consistently upheld the view that science aims at truth (Popper 1963, 1972). Of course, I must qualify this statement by saying that this is not true of the first edition of his "Logic of Scientific Discovery (1934)". And *second*, unlike the Vienna Circle logical empiricists, notably Rudolf Carnap among others, Popper argued for the falsifiability of scientific theory as the criterion for demarcating science *from* non-science on the one hand and *from* metaphysics on the other (Popper 1934, 1959, 1963; Pandit 2016b). Thus, as regards Popper's solution to the demarcation problem, science can be distinguished from *non-science*, including metaphysics, in terms of its method of producing *falsifiable theories*. Carnap's and Popper's respective assumptions and arguments may have differed in many ways, but as regards metaphysics their goals in the specific *context* of rational reconstruction of science remained essentially the same. Both of them shared the rational reconstructionist programme of elimination of metaphysical assumptions from science, when studied in the *context of justification*. However, unlike Carnap, according to Popper science aims at truth, *as if* the aim of science were unproblematic.

It might be argued against what I just said in the previous paragraph that Popper (1982a, b) held that metaphysical theses (i) can be meaningful and (ii) they can play a vital role in science, taken in the *context of discovery*. Arguably, however, we must not fail here to ask a probing question:

How do we know, or *can* we know, that metaphysical theses can be meaningful, and can play a vital role in science, if the very study of science, i.e., its rational reconstruction, in the *context of discovery*, is prohibited for philosophical purposes by Popper (1934, 1959, 1963, 1972) and others?

One might answer this question by saying that we know what kind of important role metaphysical theories play in science by resort to historiographical knowledge resources, if not by resort to the philosopher's rational reconstructions of science in the *context of justification*. So it is true that Popper admitted the metaphysical assumptions/theories – i.e., metaphysical research programmes, to be more precise (Pandit 2016b) – as meaningful and as capable of vital role in science, in the *context of discovery*. But all this should not blind us, the methodologists of science, to the fact that it is Popper himself, joined by the logical empiricists led by Reichenbach and Carnap, who prohibited philosophy and philosophers of science from undertaking any study of *science*, of any serious philosophical issues, in the *context of discovery* (Popper 1934; Pandit 1983; Pandit 1991; Pandit and Dosch 2013).

Again, Maxwell (2014) advocates, *first of all*, that science, viewed from the perspective of AOE, does not aim at truth as such, as Popper thought (Popper 1963, 1972). On the contrary, as we have considered above, science aims at explanatory truth – truth presupposed to be unified or physically comprehensible (Maxwell 2014, p.109; Maxwell 2017a, Chapter 5 and Appendix 1; Maxwell 2004, pp. 160–174). In other words, the philosophy of science that Maxwell advocates, viz., AOE, “acknowledges the real, problematic aims of science, and seeks to improve them (Maxwell 2014, p. 109)”. *Second*, as regards the question whether science should be freed of all metaphysical assumptions, Maxwell's differences with Popper's conception come again to surface when he argues that

“...in persistently accepting unified theories, to the extent of rejecting disunified rivals that are just as, or even more, empirically successful, physics makes a big persistent assumption about the universe. The universe is such that all disunified theories are false. It has some kind of unified dynamic structure. It is physically comprehensible in the sense that explanations for the phenomena exist to be discovered (Maxwell 2014, p. 119; 2004, pp. 160-174; 2017a, Chapt. 5 and Appendix 1)”.

Although part of science, the assumption in question turns out to be a metaphysical assumption that is not only untestable but also highly problematic. As Maxwell puts it, “Science is obliged to assume, but does not know, that the universe is comprehensible. Much less does it know that the universe is comprehensible in this or that way (Maxwell 2014, p.119)”.

In his argument that I have cited in a preceding section, Maxwell thinks that it is necessary that science is set within the framework of wisdom inquiry, since it is the problems of living that are more fundamental than science and the problems of knowledge (Maxwell 2010, pp. 687–688). It is important, in this context, to recognize wisdom inquiry as a *new frontier* that goes a long way beyond science in the following sense. At a time when human interests of well-being and survival, more so the well-being interests of children and women, cannot be separated from the well-being interests of Earth's bio-diverse world that hosts its ecosystems in which the top species, *Homo sapiens*, remains and will remain critically embedded, there is arguably an urgent need for a new frontier, viz., wisdom inquiry (Pandit 2012, 2013, 2016a, b; 2017b; 2019b), to help humanity on its way to solving global problems.

By hindsight, using the resources of negative feedback, we learn that humanity has arguably no option but to radically change the *course* of academic inquiry so as to address the problems of living, well-being, sustainability and climate change without losing further time. Hopefully, it can do so by changing its (*dis*)-*course* on the global issues confronting the humanity today. Under the category of problems of living and sustainability, think of the following anthropogenic problems that serve for us so far the best indicators of a global crisis:

global warming, population growth, destruction of natural habitats and loss of Earth's green cover, polluted oceans filled with world's plastic, rapid extinction of species, bio-diversity loss, vast inequalities of wealth and power relations around the world, gendered inequalities, terrorism, abuse of children, earth's polluted ecosystems in distress and, above all, a *world* permanently at war with itself, to put everything in a nutshell.

This raises the larger question how *global yet normative* can philosophy, and academic inquiry in general, claim to be in their serious pursuit of possible solutions to the unsolved fundamental problems, in particular the problems of living, well-being and sustainability of development. This question can be answered as follows. *First*, arguably one may doubt whether in the past century philosophy, philosophy of science and social sciences have been at all able to address such problems. Certainly, with few exceptions – among them Ernst Cassirer (1910, 1923/1925/1929; 2000/2001/2002), Karl R. Popper and Nicholas Maxwell – most schools of philosophy in the twentieth century failed to address these very problems. Philosophy's foremost task ought to be to address these very global problems instead of engaging in the *discussion* of trivial issues of meaning analysis and analysis of logical grammar of languages (Pandit and Dosch 2013) that has dominated the twentieth century. No doubt, as a great tradition analytic philosophy and other schools of philosophy of the last century cannot be denied their rightful place in the recent history of philosophy (Passmore 1985). But this should not be allowed to stand in the way of an urgently needed revolutionary change in the future *course* of academic inquiry, including philosophy of science and social sciences, on the one hand, and in education and STS, on the other.

Second, we must recognize that there is a great *diversity* of pressing global problems around us today. It is their diversity that the academic disciplines and institutions of learning need to take very seriously. These problems also serve as the indicators of the *malaise* from which both the academic inquiry and human civilization suffer from, the one leading to the other in a rather *vicious circle*.

Third, AOE, AOR and wisdom inquiry are undoubtedly admirable proposals deserving serious attention for their revolutionary implications for all academic disciplines, including philosophy and science, STS and ETS progress. They do not in the least imply that the rational pursuit of knowledge represented by science and technology should die first so as to leave room for wisdom inquiry, *far from that*. For what can one expect to rise from the ruins of scientific pursuits? On the contrary, Maxwell is arguing for a revolutionary, yet rational, progress from knowledge to wisdom (Maxwell 2010; 2014). Such progress is conceived as a relentless search for improvements in the problematic aims and methods of science itself, without an end.

Fourth, and finally, in an important sense, even if unintendedly, I think that the very idea of global philosophy (Maxwell 2014) should remind us of the past global philosopher-scientists, more so in the context of children’s education. Who are they? For example, one could think of Charles Darwin (1809–1882), and of Gottfried Wilhelm (von) Leibniz (1646–1716) long long before Darwin (Pandit 2001; 2006b, 2012; 2016b). Was it not Darwin (1859) who truly revolutionized mankind’s understanding of *its* place in the world of living beings, a world that is full of embedding biodiversity of our host planet Earth? By doing so he brought about a revolutionary change in the humanity’s perspective regarding the biggest *resource* of self-knowledge, if I may put it that way, thereby *inaugurating* a new global discourse about humanity, the *top species*, itself. Darwin (1859) dealt with problems of living essentially as problems of species-struggle for survival. Yet, not long ago, Karl Popper (1972) showed how much indebted his conception of objectivistic knowledge was to Darwinian revolution. Popper (1994) then served us a reminder by writing one of his last books entitled “Alles Leben ist Problem-Loesen”. Seen against the background of Darwin’s legacy, Maxwell (2014), like Popper (1994), takes another significant step forwards. He urges one and all concerned with academic inquiry, and moved by the global problems, to move from knowledge to wisdom, if we have to solve the global problems of living and well-being that confront the humanity, by resort to increasingly cooperative and rational ways of problem-solving.

7 Academic Inquiry at the Cross-Roads: How Wisdom-Inquiry Might Change its (Dis)-Course

In the year 2014, Maxwell published his book “Global Philosophy – What Philosophy Ought to Be”, a collection of previously published essays. Quite admirably, as Maxwell (2014, Preface) tells us at the very outset, these essays articulate a whole range of problems from an essentially *normative methodological perspective*. Maxwell’s discussions are wide-ranging, covering problems of education, learning, rational inquiry, philosophy, STS, problem-solving, academic inquiry, global problems, wisdom-inquiry and, above all, the urgent need for an academic revolution. Thus they draw our attention to a major failure of contemporary academic inquiry (Maxwell 2014, Chapter 1, p.7) that arrogantly keeps ignoring the path of wisdom-inquiry. Given AOE and AOR, wisdom inquiry does not and need not exclude rational pursuit of knowledge. To quote Maxwell (2014):

“When I say I have discovered the key to wisdom, I should say, more precisely, that I have discovered the *methodological* key to wisdom. Or perhaps, more modestly, I should say that I have discovered that science contains, locked up in its astounding success in acquiring knowledge and understanding of the universe, the methodological key to wisdom. I have discovered a recipe for creating a kind of organized inquiry rationally designed and devoted to helping humanity learn wisdom, learn to create a more enlightened world (Maxwell 2014, p. 111)”.

There is, undoubtedly, an urgent need for academic inquiry to change its (dis)course in a globally relevant, and revolutionary, manner so as to address the following fundamental problems (Maxwell 2014):

1. ‘What Ought Philosophy to Be?’ This is a question that every generation must ask afresh. ‘Philosophy is unique. There is no other academic discipline that has laboured for so long under such a massive misconception as to what its basic task ought to be (Maxwell 2014, p.12).’
2. Academic philosophy has failed to perform its primary task of keeping alive awareness of our fundamental problems. Above all, our most fundamental problem is this: Embedded as it is in a hugely complex bio-diverse world that in its turn is embedded in universal interconnectedness across the universe (Maxwell 2014, Ch. Two, pp. 11–46; Pandit 2001, 2006b, 2012, 2015, 2016a, b, 2017b), how best can the humanity sustain itself – “imbued with the experiential, consciousness, free will, meaning, and value” – at the interface between the human world and physical universe (Maxwell 2014, Preface vii)?
3. Academic philosophy ‘has failed, too, to highlight that academia suffers from building into its institutions a damagingly irrational philosophy of inquiry’. How best can we correct this situation?
4. How best should we address the problem of bringing wisdom inquiry into the fore-front of academic inquiry, this being a task that can no longer be postponed or ignored?
5. How should we give priority to problems of living and well-being over the problems of knowledge? Maxwell answers this question by arguing that we need to transform academic inquiry so that the basic aim becomes wisdom – wisdom being the capacity and active endeavour to realize what is of value in life, for oneself and others, wisdom thus including knowledge, but much else besides. Problems of living need to be put at the heart of the academic enterprise (Maxwell 2014, pp. 92–107; 2015).’’
6. How best should we learn the art and wisdom of thinking so as to resolve human conflicts and problems in increasingly cooperative and rational ways – say by so generalizing the PAMS so that they become fruitfully applicable to all other institutions, to society and economy? But this requires, first of all, that these methods are correctly characterized.
7. How can we learn to understand the world as an *interconnected* whole that can be best studied by a less fragmented approach than is made possible by means of the specialized branches of science and technology, given the twentieth-century’s record of science and war, the nuclear arms race, global warming, anthropogenic climate change challenge, structural violence and terrorism, poverty, rising inequality, forced migrations, over-population and other man-made catastrophes?
8. How ‘do we go about creating a kind of education, research, and scholarship that really will help us learn wisdom and create a wiser world’ (Maxwell 2014, p. 113; see also Maxwell 2018, pp. 173–187)? Because modern scientific and technological research ‘has met with absolutely astonishing, unprecedented success’, it is reasonable to look to the methodology of *science* – i.e., to *its* PAMS - as the key to answering this question. It is reasonable to do so, even if it is true that modern science and technology are part of those global environmental challenges the humanity is confronted with today.

8 Future of Education, Philosophy and Academic Inquiry

More important, in today’s world there is neither clarity nor unanimity regarding the aim of education in general and education of children in particular. If the education and

well-being of children across the globe is in a great mess (Pandit 2018), academic inquiry itself, though the latter belongs to a much higher level of education and research, is at the crossroads. Maxwell's "Global Philosophy – What Philosophy Ought to Be" *reconnects* academic inquiry in general with the education of children from age five onwards admirably and remarkably so well, arguing how the fundamental misunderstandings concerning the former lie at the root of our common mistaken approach to the latter. It is important to remember that education of children should not aim at the *indoctrination* of their young and budding minds, as has been the case all along until now. Instead, it should aim at inculcating in them the art and wisdom of co-operative and rational discussion of problems, at the same time encouraging them to gain insight into the problems of living by actually engaging in problem-solving activities. In particular, this aim can be best realized by introducing *philosophy seminars* at the core of children's education in two major steps:

"It is nothing less than an educational scandal that seminars of this type are not a standard part of school and university life, available to everyone from the age of five years upwards (Maxwell 2014, p.6)".

Thus, for example, it would be of immense value to children's education, if they learn to distinguish between indoctrination and cooperative discussion. Moreover, what would be equally of great service to children's education is to change *its course* as follows:

That instead of the educational systems in place in different countries across the globe presenting the world to the adults as a *fragmented world*, that is presumed to be 'best' accessible for studies through the *lenses* of the individual specialized disciplines, it be *presented* to children as an *interconnected whole*, doing justice to children's own way of experiencing the world.

It is important that this aspect of children's life is turned into a chapter of the philosophy seminars for children. For example, just think of the healthy impact the valuable imagery of *the world as a whole* as a single family ('*vasudhaiva kutumbakam*' in classical Sanskrit), that was highlighted 5000 years back by the highly gifted ancient Indian seers, the creators of the *Upanishadas*, can have on children's minds if taught in today's schools.

But Maxwell's (2014, p. 9) proposal is accompanied by *two* important *warnings*. The *first* warning is against the orthodox analytical conception of philosophy that attributes to it the distinctive task of 'puzzle solving' and conceptual analysis focusing on the meanings of words and sentences in a language or in a conceptual framework. This warning underlines the urgency of bringing about a revolutionary change in the aims and methods of academic inquiry as a whole including science, philosophy and education. This is a point of major significance that Maxwell brings home to one and all interested in urgent changes in academic inquiry. Maxwell's *second* warning is against thinking of the philosophy seminars *as if* they were to be confined to children's education. Given a reformed conception of philosophy, that we have still to go a long way to articulate properly, he urges us to make them central to *all* of education. This is clearly a call for a *philosophical turn* in education. It is important to recognize *how* by

heeding Maxwell's proposal to take a bold *philosophical turn in education* in the present sense, philosophy itself gains bright prospects of retrieving its *normative tasks* that it has seemingly either forgotten or lost during the twentieth century's focus on the analytic function of philosophy, on philosophy and philosophy of science as meta-theoretic disciplines (Pandit and Dosch 2013). What we have to learn here is how to retrieve the normative philosophical tasks by moving beyond meta-theory, integrating science and philosophy *and* returning back to natural philosophy.

I think that there is still a major problem, rather a whole *set* of problems, lurking here that has not received the attention it urgently deserves. Briefly, I may formulate it as follows:

Whether taking the philosophical turn in education in the sense of Maxwell (2014) would be enough to address all the problems relating to *children's education* and *children's well-being*, if taken as a single *unified agenda* (Pandit 2014, 2018)?

What I have here in my mind is the following problem. Think of the most heinous crimes being committed against children, e.g., *child malnutrition*, *child labour* and *sexual abuse of children* that are so rampant across the world, in almost every country without exception. They are so wide spread that the daily news flashing the *reported*, if not the *unreported*, crimes being committed against children are seldom received *in surprise and pain*. On the other hand, equally serious, think of our *collective failure* to prevent the ever-diminishing role of the family in the well-being of children (Pandit 2007c; 2017b; 2018). I think that, taken as a *unified agenda*, these two kinds of global problems already build up a *dark scenario* that makes the educational systems across the world look even *more scandalous* than the absence of philosophy seminars for children does (Maxwell 2014; Pandit 2014, 2015, 2018). Though not highlighted in (Maxwell 2014), all these problems deserve serious attention. Yet, I think that this book takes another important and decisive step in the forward-looking perspective of wisdom inquiry, of AOE and AOR. The re-designing of schools and the institutions of learning, of healthcare and education in particular, is imperative, if science, education and academic inquiry have to have a future so as to come out of the just alluded to *dark scenario* (Pandit 2018). Considerations such as these make wisdom inquiry a categorical imperative, if we, philosophers, philosophers of science, scientists and academicians in general, even the world's civil societies and the governments in the individual countries, at last want genuinely to address the global issues that are crying for cooperatively rational solutions, using AOE and the generalized methodology/methodologies of AOR, among other possible rational means.

9 Why the World Is Not Ready for Moral Progress: Technology's Totalitarian Take-over or a World Morally Gone Bankrupt?

I want to conclude by drawing attention to the most neglected problems of AIMS-driven automation and ETS progress. One of these problems is the problem of *moral progress*. Quite obviously, today's world is more dangerous than yesterday's world. That needs no proof. It is not only more dangerous, it is also more fragmented, as will become clear below. The question arises why more and more ETS progress always

means increasingly ‘more and more of risk society’, ‘more and more of global risks’. The greater the acceleration in ETS progress that mankind makes, the greater is the risk and hazard the society must incur, as becomes clear from the GHG-emissions driven global warming that has negative consequences that can result in *negative externalities*. But why is this so? Why is the curve of ETS progress so regressive as well as tortuous for the *top species*? There is no easy and simple answer to these questions. I think that over the past many decades, the *threat of technological totalitarianism* posed by ETS progress has become *menacingly* real globally, more so as we entered the era of AI research for accelerated automation, for military purposes, for civil aviation, for trade and commerce and for so many other things. And just think of the race for robots to replace the humans at an alarmingly accelerated pace. The race for the algorithmic leader has become one of the heaviest priority-investment-sectors across the world, *without* any body or any discipline being able to set up or spell out an *upper limit* to AI research for automation (Pandit 2014, 2017b; 2016b; 2019a). What is surprising is the fact that investment in AI research across the world flourishes without a *regulator*. This poses the biggest challenge to the political economy of the environment world wide, to wisdom inquiry and to natural philosophy everywhere, all the more so because of the future possibility of the AIMS getting increasingly, even unpredictably, smarter than their masters, the *top species*, *Homo sapiens* (Pandit 2016b).

Yet, evidently ethics of science and technology are increasingly turning out to be the most important frontier in STS on the one hand and in R&D policy on the other. Therefore, it is imperative that ethical issues are not only articulated, instead of being repressed, but rigorously debated. This means that when the scientists and philosophers talk of ETS progress, they can no more get away from the questions relating to the inculcation of values of wisdom, moral progress and moral responsibility, especially among the younger generation (Pandit 2007c, 2009). Above everything, ambivalence of science must be recognized, as Werner Heisenberg (1989 p. 494) had wisely urged us. But what were his ethical concerns like? Where exactly do science policy and human and environmental interests get interconnected and, more importantly, into confrontation? Did Heisenberg indicate a way of improvement, given that human activity has *negative* local and global impacts on environment? Briefly stated, he was one of the very few leading scientists of the world who were ahead of their times in conceptualizing this problem with remarkable insight and clarity. The problem, as he perceived it, has many levels of complexity, as it were, enfolded into it, from what he aptly described as the ambivalence of science *to* the paradox of all paradoxes, that it is ETS progress which controls moral progress and not the other way round. Approaching the new situation optimistically, as he did, he believed that it “reveals new and unexpected dangers, and these dangers should be considered as a challenge requiring our response”. Heisenberg proposed then, as a guiding principle, “to consider any special progress in science or technology as a part of the whole, as something that cannot be separated from the general problems of our way of life, our environment, our political behavior. This obligation - to keep in mind the unavoidable connection or interplay between all actions - will set and should set limits to our blind confidence in science and technology, but not necessarily to science and technology themselves” (Heisenberg 1989, p.494; transl. and cited in Pandit 1995, pp. 67–68).

If all forms of ETS progress have invariably negative consequences resulting in *negative externalities*, then it is imperative to rethink science in particular and academic

inquiry in general with a view to redesigning the institutions of learning, research and policy-planning. The important question is what should the institutional redesign and innovations of the future within the revolution in academic inquiry be as to foster moral progress? I think that, among other things, it is necessary to ensure the following:

1. The principle of self-regulation: That every institution or organization sets up an ECS (Pandit 2010d) as part of its inner dynamics to take care of the present and future challenges, particularly where policy planning and sustainable development are concerned.
2. The principle of prioritization: That the institutions of the state and the international institutions engaged with formulation of public policy put a higher priority on moral progress within political economy and society than on ETS progress.
3. The principle of stakeholder-participation in decision-making: That the participation of all those who have a stake in the health and delivery-system of an institution or organization should be encouraged to participate in all levels of decision-making which impacts policy and development planning. Thus, if we are thinking of a firm, a company or a university or an international organization, stakeholders include not only the employer, the shareholders, or the beaurocracy in-charge of management of finances or administration. They include all the work-force, the skilled and unskilled employees, and the tax-paying civil society.

The second and third requirements can be fulfilled only if the institutional dynamics is enriched with ECSs (Pandit 2010d) not as a mere decorative step but as a system of *self-regulation and monitoring* built-into the institutional structure itself. In this way, an ECS can bring ethical imperatives and regulations to bear upon the institutional design, policy planning and development in a creative, flexible and decisive way. But still all this may not be enough to foster moral progress, as will become clear below.

The blind race for technology, for AIMS-run ETS progress has landed the *top species* in double, rather multiple, mystery where we had in earlier times begun with the simple question “Who am I, a biological black-box or a soul?” In the accelerating man-machine, man-robot, interface-building, the mystery has only deepened. It is multiplied. We are now witness to a scenario of multiple black boxes coming face-face with one another where previously the individual and society asked questions about the universe and the ‘self’, which is no more so. In this scenario of black-boxes facing, and *interfacing with, one another*, the space, if there was any, for interrogation in search of moral progress disappears completely. Instead, we are left with a scenario of global arrogant ignorance that may simply be described as *the age of arrogance*. Let us consider some instructive examples.

Interestingly enough, it was the German philosopher Gottfried Wilhelm von Leibniz (1646–1716) who reminded humanity of how much *evil* already fills the world., i.e., our world. Yet, Leibniz quite optimistically designated our world as *the best of all possible worlds*, in which we are born and in which we have to live, striving to bring improvements here and there (Pandit 2012, 2016b). There is no doubt that at any time our world is filled with the evils of invisible pain, state-sponsored collective crimes, war and violence, poverty, hunger, disease, natural catastrophe, and the like, despite the ETS progress making us, *the top species*, feel not just proud of our achievements but *arrogant* in our attitudes to one another and towards nature as a whole. In this scenario, a large

number of *questions* arise that we must never fail, nor feel tired, to ask, because directly or indirectly they raise the most neglected problem of moral progress. As an example of how capable humans are in creating more evil in our world that is known for the evil that already exists, think of the *genocide*, the systematic state-sponsored killing of six million Jewish men, women, and children and millions of others by Nazi Germany and its collaborators during the World War II. And think of the evil possession and abuse of nuclear weapons.

Again, recall how the Air France Flight 447 on June 1, 2009, an Airbus jet with 228 people on board, crashed into the Atlantic killing everyone including the crew. The plane's AIMS-driven *automated system* was expected to require pilot assistance in the rarest of scenarios. While flying over the Atlantic, it transferred control to the pilots, who became confused and miscommunicated. They kept fumbling with the controls until the plane crashed into the ocean. In public perception as well as news reports, the pilots became the culprits although investigations eventually faulted the plane's "poor systems design" and "insufficient pilot training". Was this not an over-simplification at its best, raising many *unasked* questions? How was this tragedy different from a ruthless act of 'terrorism', *even if* triggered by the plane's automated system? What is the responsibility of humans who are obliged to work in a complex, interactive system, *interfacing* with an automated system designed by others? More important, AIMS driven systems, interfacing with humans, raise enormously complex issues of system design and moral responsibility that cannot be solved by simply distributing the blame between the man and machine. Any fault in the system design is, in its turn, a complex issue in its own right. In any case, the more serious problem is this:

Whether by creating increasingly more and more dependence on robotic interfaces in the world, say between AIMS and humans, the leading Tech companies of the world are not creating more and more *evil* over the evil that is already present in our world by its very nature?

Now, what are those questions that raise the problem of moral progress and that we must never fail to ask? I think that there arise at least *six* types of questions as follows: *First*, if we do not close our eyes to *anthropogenic evils* and *negative externalities*, and their adverse impact on earth and its oceans (Pandit 1995, 2004; 2007a, b, c; 2012; 2013; 2016a, b; 2017b), there arise questions from the perspective of international political economy of the environment that we have failed to ask in the past. Arguably, it is the problems of living/human well-being that ought to be in focus at the centre of any project of ETS progress, where human well-being *cannot* be separated from the well-being of our *host planet Earth* and its oceans. Until now, the trajectory followed by the ETS progress has evidently violated this principle of interconnectedness between the *two*. The oceans being the blue lungs of our host planet Earth, their health plays a crucial role for life and biodiversity on this planet. Annually, the oceans absorb more than 25% of the carbon dioxide the humans release into the atmosphere. Since the start of the industrial revolution, the oceans are estimated to have absorbed half of the anthropogenic greenhouse gas from the atmosphere. Thus, without them, the carbon dioxide concentration in the air would have been much higher and the Earth much warmer. But how are the oceans themselves doing today healthwise? While exploring the causes for ocean acidification, Alfred Wegener Institute (Germany) researchers found that the growing content of carbon dioxide in the air would also change the

chemistry of the oceans. They now work at the frontier of how adversely the acidic seawater affects its inhabitants and ultimately also humans. Using a scientific jargon, ocean acidification has been very aptly described as the *evil-twin of climate warming*.

Second, what about the anthropogenic evil global warming *itself* and the SDGs-2030? After the 2015 Paris Climate Agreement among individual countries to limit global warming to well below 2 degrees Celsius, and to “pursue efforts” to limit it to 1.5 degrees Celsius, what is the progress as regards (i) efforts to accomplish this task; (ii) country-wise Intended Nationally Determined Contributions (INDCs) outlining their post-2020 climate action, and (iii) efforts to pursue the SDGs-2030? Can we say that the world has found an agreed solution to the problem of reduction of anthropogenic emissions of GHG that impact the global climate *negatively*? Evidently, the world is yet to wake up to the alarm bells that are loud and clear as to how an unchecked increase in *their* concentration *now* will result in an increase in the mean atmospheric temperature with *evil consequences* for the most vulnerable parts of our globe. The evil of global warming will then cause a higher frequency of natural catastrophes, such as droughts, floods, and heat waves, higher mortality rates, and a significant loss of biodiversity. Remember that the catastrophic consequences of the accelerated anthropogenic global warming do not only have economic costs in terms of a failure to achieve the SDGs by 2030. They also have huge costs in terms of human failure at the frontiers of human well-being, health care and human rights.

Third, what is *moral progress*? Capable as we the members of *the top species* are in the field of ETS progress, are we also capable of *moral progress* that alone can guarantee improvements in the quality and value of ETS progress? Why is our failure to ask the right questions regarding moral progress the biggest failure of our individual and collective responsibility? When could we say that the world we are constantly churning out is ready for making moral progress over and above the AIMS-run ETS progress? When is it possible to call *human progress* in any form as a step towards moral progress? To answer this important but neglected question tentatively, I think that it is reasonable to call any form of progress that mankind makes *as moral progress only if it* enhances the capacity of humans to cope with the diverse kinds of evil in the world *without* creating more evil in it. To put it more modestly, we may call any kind of progress mankind is capable of making *moral progress* only if (i) it *decreases*, instead of increasing, the *evils* that already fill our world; and (ii) it itself does not create any new kind of evils in the world.

Fourth, how thin is the line between (i) our lives being run by technology, i.e., by accelerated AIMS-driven automation and (ii) our world being *run over* by technology? There were times when the lives of children were shaped by their families, by their schools, and later on by their colleges and the universities. Today, can we say that things have not changed beyond recognition? Think of the devices and algorithms by which individuals forfeit their privacy and autonomy for the benefit of either themselves or some third party. The consumer services, the workplace, government and politics, all are invaded by them. What is worse, they also empower the new ‘terrorist-world’ to fight and finish their *victims* with the *latter’s* tools. *Moral progress* matters precisely because without *it* we cannot understand the difference between the two things, viz., the world being run by AIMS and algorithms *and* the world being *run over* by them and their abuse, as in the case of terrorism. Consider, e.g., how it is the *run-over technology* which is at work in the permanent threat of terrorism “and the

expansion of the security state it continually authorizes, from citizen surveillance to drone killings to immigration controls. In the contemporary world, threats such as this are affectively ever present (Richardson 2018, p. 4)". As Massumi (2015, p. 22) puts it, "This is the figure of today's threat: the suddenly erupting, locally self-organizing, systemically self-amplifying threat of large-scale disruption". Add to this the "background hum of potential crisis", "the generalized condition of the affective present in the national security sphere and, increasingly, in relation to climate as well (Richardson 2018, p. 4)".

Fifth, we take pride in creating AIMS to enhance the technological, political and economic prowess of mankind. We do so without any thinking and questioning how best we might dispose of these AIMS when they become out of date, or useless, or *smarter* than us. This sad story extends to the world's stockpile of nuclear weapons, automated war planes and other types of lethal weapons; and to its race for domination of space in our solar system. What is most puzzling is this. There is no regulator in the world to regulate the creation of AIMS and to oversee the AI research for accelerated automation. No surprise, if the international political economy of the environment is in a shambles (Pandit 2004; 1995; 2007a, b, c; 2012; 2013; 2015; 2016a, b; 2017b). On the other hand, we human beings, *the top species*, are a kind of biologically designed 'meat-machines' that are capable of doing all those things that the man-made AIMSs can do, and much more besides that. No surprise, if our bodies are seemingly resilient yet so fragile, in need of constant care and repair. No doubt, we have evolved and developed a civilization that has been in constant flux but that is now on the threshold of disappearance, more so if man-made climate change stays unmitigated. And, we have developed rituals and practices of disposal of our bodies when we die, each religion in its own style. It cannot be denied that our practices of disposal of our own dead bodies do impact the political economy of the environment, regionally and globally, as all human actions do.

Sixth, can humans *outsource* every activity to technology? Can we outsource all global challenges, for which we ourselves hold responsibility, *to* technology? For example, think of outsourcing the challenging global tasks, *from* mitigating the climate change to eradicating terrorism globally, *from* lie detecting at international emigration counters to prosecuting those who are guilty of heinous crimes against humanity and the like, *to* AIMS. At the dawn of the digital world, it may appear *as if* the answer to these questions is in the affirmative. But we must remember that there has never been a technology that has not brought damaging *negative externalities* with it. The question arises whether we have thought of all the consequences that would follow our outsourcing everything to AIMS. There is enough reason why we should be worried about the most dangerous consequence, viz., *technological totalitarianism*. In so far as the corporate world and the political class across the globe put their absolute faith in the value and trustworthiness of the machine, such as AIMS, compared to little or no faith in the value of citizens – i.e., the faith that dictates that machines *cannot*, while humans can always, lie - they celebrate technological totalitarianism. It is a part of the creed of technological totalitarianism to believe that the automation and its software can never fail. This is demonstrated in the case of the Air France Flight 447 of June 1, 2009. Recall the *scenario* of how its pilots struggled to mitigate a disaster caused by the unpredictable malfunctioning of complex and inscrutable technical systems. It also tells us that sooner or later technological totalitarianism must break down if subjected to the

scrutiny of moral responsibility, both individual and collective. In this kind of *scenario*, one might ask whether the line between the “ethical” and “unethical” does not get blurred, thanks to ETS progress and the endless human craving for AIMS-driven automation.

In the age of technological totalitarianism, call it simply digital world if you like, if at all you are worried about your privacy, you may relax. Whether you believe it or not, the big tech companies are there to take care of your privacy. When technology controls every aspect of our lives, the big tech companies are obliged to think of themselves (i) *as* the engines of change in making “knowledge” freely available on mobile devices that has negative consequences for privacy, although it is debatable how far “knowledge” can be identified with information including *misinformation*; (ii) *as* the custodians of user data, given the fact that we are now living increasingly digital lives, with our intimate details stored digitally; *and* (iii) *as* the protectors of user data, given the recognition that the big tech companies that serve as custodians of user data have an obligation to protect that data. As users are engaging with technology more than ever before, you need the big tech companies to put users themselves in control of their privacy, as the CEOs of big tech companies evidently believe. The users are storing more information about their private lives digitally. The information stored creates both risks and opportunities to erode or improve privacy. The tech companies are under increasing obligation to safeguard the user privacy, defined *digitally*. In other words, what “privacy” means in the digital world depends on which tech company, i.e., which ‘context’, you are talking about: ‘Facebook’, ‘Twitter’, ‘WhatsApp’, ‘Instagram’ and the like. Thus, “privacy” in the digital world is a product that these tech companies offer you, each under its own trade mark. Why only privacy, even “knowledge” changes its meaning, depending on the ‘context’. So don’t be surprised, if you learn that it is the prerogative of the CEOs of tech companies to go for privacy policies *for you*, and not you yourself. However, the important question is whether the users would still have the *right* to fight for their rights – now compromised and threatened by ‘contextualization’ in the digital world – if their “privacy” is violated.

Rarely will anything that happens in the name of ETS progress stand scrutiny in terms of the indicators of moral progress the above questions hint at. When the advances of ETS progress are regularly being celebrated as *rituals of knowledge society*, why do we fail to ask: *Whether moral progress matters for human well-being, for children’s education and for women’s dignity, in particular?* We fail to ask this question even in the face of climate change crises caused by the ETS progress of the last several hundred years. Is the failure of not raising the questions of moral responsibility and moral progress an indication that the kind of world we have shaped to live in is a *morally bankrupt world*, incapable of making any moral progress? The answer is yes. Otherwise, how can we explain our collective failure of not having even thought of an *ethical regulator* for creating AIMS for automation?

Ethics is intimately related to individual freedom, the freedom to choose between performing an action X when one could as well choose to perform an action Y. Here, it is not my concern to capture what is ethical in the context of human action and what can count as moral progress in terms of abstract definitions. Arguably, it is always possible and sufficient to clarify these fundamental concepts by means of examples of fundamental issues by interrogating what we commonly celebrate as ETS progress. Normally, it is the societies themselves that judge the individuals in terms of well-

recognized ethical standards or values. And as soon as the examples of ETS progress resulting in moral degeneration come to light, does it become possible to pause and deliberate on the nature of moral regression. More importantly, it is imperative to clearly distinguish between the ethical standards and values of good life *and* the indicators of moral progress. This is a distinction that is conveniently either forgotten or ignored, more so whenever individuals and societies indulge in narratives and discourses of ETS progress of mankind, *invariably* putting technology, instead of our *business-as-usual attitude* to our life style and to nature, at the center of everything. Thus, if the humanity is confronted by the challenge of anthropogenic climate change, discourse on ETS progress dictates technological solutions *now and in the future*. No concern is shown at all as regards just alluded to *business-as-usual attitude* of humans to problems of living and to nature.

It is said that “Throughout history, the application of technology has been shaped by our wants and needs as a society”. One of the best illustrations is the *spontaneous* social acceptance of ‘Tech media companies’ as ‘social media’, globally, without a single interrogative whisper. I am here referring to the Tech ‘giants’: ‘Facebook’, ‘Twitter’, ‘WhatsApp’, ‘Instagram’ and the like. It is these that are today believed to ‘integrate’ our world that is, in reality, a highly and deeply fragmented world somehow held together by the racing *businesses-as-usual* on the one hand and by the diverse religions on the other. In this world, there is place for ETS progress. But it has *no place* for moral progress. One reason why this is so is that the *acceleration* with which the ETS progress takes over, *as it were* automatically, rules out space for moral progress. It follows that unless the pace of ETS progress is slowed down, the world will not be ready for moral progress, i.e., the progress that can take humanity to qualitatively newer heights. It is in principle possible that the advancing AIMS will one day replace humanity on our planet by virtue of the latter’s strides in ETS progress. But it is impossible that the AIMS-driven world will be capable of moral progress. In other words, all the ETS progress that the humans are capable of may be AI-reproducible – i.e., reproducible by resort to AIMS. But it is only humans who are *in principle* capable of moral progress. This can be demonstrated by the unique human capability of interrogating ETS progress itself in various ways. The more relentlessly we interrogate ETS progress, the better are the chances of preparing our societies and institutions for moral progress. Hence it is crucially important to ask: When could we say that the world we are creating is ready for making moral progress over and above the ETS progress?

As a concluding word, suffice it to say that the ecosystems of the oceans, and of the earth as a whole, that host life in all its biodiversity, are in great ecological distress, thanks to the accelerated ETS progress. Have we ever cared enough for their health and resilience? Have we ever thought of their vulnerability to environmental impacts of our own irresponsible actions that are directed at ETS progress? Without their resilience, neither our planet could host life in all its biodiversity nor could the humans breathe and engage in scientific and economic activity. Have we ever asked how would it impact the quality of life of school-going children and college-going students, if they learnt very early in their life what it means to care for nature’s/oceans’ ecosystems, what it means to take care of the quality of your own life and of Earth’s bio-diversity? To put it very simply, have you ever cared to know that if you care for nature’s/oceans’ ecosystems, they will take care of the quality of your own life and that of Earth’s bio-diversity. Today, it is no more a secret that our planet and its oceans are threatened

by climate warming challenge, thanks to all human activities that are directed at ETS progress. Humanity's biggest failure lies then in this: We have never properly thought of how the political economy of the environment, regionally and globally, could be so designed as to prevent the *negative externalities* like the "Great Pacific Garbage Patch", an estimated 80,000 metric tons of plastic inhabiting the patch, from arising (Pandit 1995, 2004, 2006b, 2007b, c, 2010d, 2012, 2013, 2014, 2016a, b; Pandit 2017b).

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