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Science, Philosophy, Practice: Lessons from Use

Eleonora Montuschi

Dept of Philosophy and Cultural Heritage, University Ca’ Foscari of Venice, Italy

eleonora.montuschi@unive.it

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**ABSTRACT:** It has been urged that philosophers in the contemporary world should be able to engage with domains of practice and not just with each other. If that is the case, in what sense philosophy can become an ‘applied’ discipline, and with what consequences both for philosophy and for practice? As a preliminary I will rehearse some of the reasons why philosophical investigation is socially commendable. I will then show (sect. 1) how philosophy in so called knowledge societies should interact with science and the contexts where science is used. A suitably formulated idea of interdisciplinarity (sect.2) will suggest the necessary epistemic conditions to achieve this interaction. I will use two illustrations (sect.s 4 and 5) from the specific field of the philosophy of science to point out the kinds of readjustments required by philosophical analysis not so much to apply but to ‘engage’ with practice (in a sense qualified in sect.3).

**Introduction**

IN 2010, IN THE IMMEDIATE AFTERMATH of a global economic crisis of huge proportions, Martha Nussbaum vindicated the ‘not for profit’ value of the study of the arts and humanities disciplines, the importance of teaching critical thinking and reflection, and the need for developing a human model of education for the health and survival of our democracies. (Nussbaum 2010) As counterintuitive as it might appear, we are told, investing in the humanities is ultimately a profitable pursuit. It prepares for responsible citizenship, better opportunities of employment and not last, meaningful lives. ‘For profit’ and ‘not for profit’ is though a false dichotomy. “A strong economy is a means to human ends, not an end to itself.” (Nussbaum 2010, 10) Privileging the former to the detriment of the latter would deprive the purpose of economic growth of one of its most powerful tools of success. On the other hand, succeeding with economic growth “does not mean producing a healthy, engaged, educated population in which opportunities for a good life are available to all social classes.” (Nussbaum 2010, 15) Numeracy and technological training do not immediately translate into sensitivity about class, race, gender, or into historical or political awareness.

Already in the 1980s Bernard Williams made the point that the Humanities are under-supported, and they need defending. (Williams 1987) One widespread form of attack is to say that the humanities are a ‘luxury article’ and we live in historical hardship. Responding to this attack by claiming that the humanities are the gateway to a civilized society is however weak, says Williams, in that it implicitly accepts their luxury status. Another response to the same attack could be to say that the humanities are a necessity if we want to produce educated, honest, truthful, mature individuals. But this is an equally weak line of defence, Williams points out, as we are not told how these ‘better’ individuals would play a role within the wider society and what advantageous consequences such types of individuals would bring to society itself. All in all, both kinds of defence lack in political vision as they focus on “desirable qualities of cultivated individuals.” These kinds of defence take the wrong starting point, Williams claims. We should instead proceed from discussing the “necessarily institutional pursuit of certain subjects, of certain kinds of knowledge”, or understanding “what they are and what they do”, and only then assessing their possible role in society – a line of argument akin to Nussbaum’s.

Of course, when we come to question types of knowledge, in our societies the first domain that comes to mind is that of the sciences – in particular, Williams notes, when it comes to understanding society, we think of the social sciences. But relying on social scientific investigation without a well-informed critical understanding of the historical, philosophical, cultural background wherein such investigation is carried out and questions are addressed and answered, will not deliver the results sought for. It is the symbiotic connection between social understanding and what the humanities have to offer to such understanding that justifies the latter as worthy subjects of research, and as appropriate forms of knowledge. The same, we can add, goes for the connection between the humanities and the natural and life sciences. And here philosophy in particular has a role to play, as will be argued in this paper.

In what follows I will first select one context of practice (science-based knowledge in knowledge societies) where philosophical investigation ought to prove its worth. I will proceed to analyse some of the epistemic conditions that allow philosophy to take up challenges originating from that context and how philosophical inquiry is to respond to those challenges. I will use two illustrations from the specific field of the philosophy of science to demonstrate how philosophy and practice can interact, and with what consequences for the use(s) of philosophy. In so doing a more inclusive idea of applied philosophy will take shape, able not only to address practical issues but to ‘engage with’ them.

**Philosophy and the sciences in ‘knowledge societies’**

Knowledge is a central, and highly controversial concept in our societies. It has long been argued that modern societies are *knowledge societies* (Stehr 1994), which is other than *information societies*, i.e. societies inundated by the production and often unregulated diffusion of information coming from all sorts of sources. They are instead societies that look and invest on knowledge as a ‘commons’, i.e. as a resource shared by a community (Hess-Ostrom 2007) in view of promoting the public good.

The type of knowledge at the centre of this model of society is normally science-based. It is precisely this type of knowledge that has on one side, entered the day-to-day negotiations among individuals (Cerroni 2007) and on the other, informed policy making processes and political action. However, injecting social negotiations and policy/political decisions with ‘knowledge as commons’ is not a miraculous cure. First of all, science-based knowledge brings with it a vast amount of risk and uncertainty, typical of that knowledge and of the contexts where it is applied – modern societies have also notoriously been defined ‘risk societies*’* (Beck 1992) – one of the possible consequences being that of becoming a source of inequality and social exclusion. Secondly, the political and social use of that knowledge, though potentially beneficial, is not automatic, or a given. Looking for example at the way the so called ‘Evidence-based Policy and Practice’ movement has been used and implemented, one wonders whether – despite its widely recognised value and relevance – it has been taken sometimes as a model of governance expected to provide ‘mechanical’ solutions which overall do not require further in-depth, meticulous, comprehensive analyses of what makes evidence really useful to, and usable by policy, or of what a concept of ‘evidence’ adequate to the purposes of practice should really include (e.g. along the perspective put forward by Cartwright-Hardie 2012). The evidence that drives policy decisions should not be mono-dimensional. This is partly because scientific evidence might be uncertain, or incomplete. But even when best science is available, decisions should include a wide array of factors and elements that have to do with the wider socio-economic-political context science itself is a part of. Besides, this analysis should not only look at the quality of scientific evidence in the contexts of its use, but – we might add – at the quality of the *scientific advice* based on the available evidence, and under the wide spectrum of conditions of complexity and/or uncertainty that concern both science and policy making. We will return to this later, when discussing the first of our two illustrations. Here we just want to make the point that thinking of evidence (and of scientific advice based on evidence) in the context of knowledge societies requires critical skills that often go beyond the single expertise – either of the scientist or of the policy maker, or even of both paired together. This opens the ground to acknowledging the role and value, in the contexts where science is produced, practiced, and used, both of interdisciplinary collaboration and of philosophical contribution. Let us look at each of these two aspects at a time.

**Interdisciplinarity: turning application into a real option**

The first to use the word ‘interdisciplinary’ was Jean Piaget:

Enfin, à l'étape des *relations* interdisciplinaires, on peut espérer voir succéder une étape supérieure, qui serait "transdisciplinaire", qui ne se contenterait pas d'atteindre des interactions ou réciprocités entre recherches spécialisées, mais situerait ces liaisons à l'intérieur d'un *système* total sans frontières stables entre les disciplines." (Piaget 1972, 144; my italic)

If we follow Piaget’s suggestion, the emphasis of interdisciplinary research must be put both on *relations* and on *system*. This means on one side, finding a way to combine the different disciplines in view of achieving an understanding of the objects of investigation that proves to be more satisfying than what could be achieved by means of the tools made available by single disciplines. On the other side, it leads us to rethinking the borderlines of the single disciplines as being open, malleable, and permeable in view of achieving a result of a new systemic understanding (for which Piaget introduced the further connotation ‘transdisciplinary’). Both tasks are methodological, but they entail an underlying answer to an ontological question: when we pursue interdisciplinary research, what are we applying the different methods to?

This is not a simple question to address. One outcome of disciplinary training is that different disciplines tend to see the world differently. They specialise in studying different phenomena or different aspects of the same phenomenon. And this of course might lead to disagreement and conflict. If the aim is to pursue a type of research that benefits from the different perspectives, rather than being hindered by their interaction, how can differences be managed? A suitable tool in interdisciplinary research literature is offered by the concept of ‘boundary objects’.

The concept was introduced by Susan Leigh Star and James Griesemer (1989):

Boundary objects are objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. (…) They may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation.” (Star and Griesemer 1989, 393)

Some of the boundary objects that Star and Griesemer list include specimens, field notes, and maps of particular territories. These objects interact with members of various social groups (including amateur collectors and museum professionals) but are used to very different ends by each group.[[1]](#endnote-1) Boundary objects are a common point of reference that yet entails layers of differences. For example, the concept has been usefully employed in the field of XX century physics by the historian of science Peter Galison to show how different scientists belonging to different traditions can actually understand each other. (Galison 1997) Experimental microphysics is a complex and fragmented reality, constituted by different technical traditions each endorsing the different angles from which ‘atoms’ can be (and are) studied. It is a reality made up of different subcultures, within physics but also beyond – a whole array of “border territories” (Galison 1997, Preface xx) that all together make sense of what physics really is and can do: computer programming simulating “how to acquire, store, and sort the data”, (Galison 1997, Preface xxii), industrial designing and production of experimental pieces of machinery, even the politics of playing scientific technology in society.

 The expression ‘boundary object’ could also be used in the domain of social research, for example to measure an object such as ‘racial health disparities.’ “‘Racial health disparities’ are differences measured in the average health outcomes of people from different ‘race/ethnicity’ groups in the US.” (Efstathiou and Mirmalek 2014, 236) For example, they can be expressed by statements such as ‘Black adults are 40% more likely to be diagnosed with diabetes than non-Hispanic White adults’; or ‘71% of people with HIV/AIDS reported in 2010 belonged to racial and ethnic minorities’; or ‘tuberculosis was diagnosed 8.5 times more in Blacks than in Whites in 2007’; etc. Because of insurance and geography, people identified with particular categories of ‘race’ and ethnicity have a harder time getting health care, and when they do get care, it is on average of poorer quality than health care given to non-Hispanic Whites. In 2010 a National Institute of Minority Health and Health Disparities (NIMHD) was set up with the explicit aim to target disparity by looking into its causes, and causes were identified in three areas: society, the environment, and genes.

So here is the situation: one problem, and at least three fields of expertise to deal with it (social, environmental, genetic). In Efstathiou and Mirmalek’s words:

Health experts might agree on the challenge, broadly put: How can we get everyone to have good health, irrespective of their ‘race’ or ethnicity? Yet, exactly what is at stake here is not so clear. Health scientists trained in the social sciences tend to see social and economic solutions to this problem, whereas scientists with training in genetics and molecular biology are pursuing pharmaceutical and pharmacogenetic solutions. (Efstathiou and Mirmalek, ibidem)

Different groups of experts tend to see things through the lenses of their own field of expertise, sometimes ignoring perspectives different from their own. Each group might think to hold the right perspective, rather than one among several. However, the very fact that they all more or less literally ‘sit together’ trying to solve a problem called ‘racial health disparities’ suggests that there is a shared starting point for inquiry – an issue for which negotiating a solution that might take into account the different sources of expertise is a worthwhile pursuit.

A useful way to try and resolve differences is to understand and agree on the use of terminology. To use the latter example, do social science health professionals and bioscience experts mean the same thing by ‘race’? The category of ‘race’ is used to classify people according to their physical features (facial attributes, skin colour, hair texture etc.), ancestry (referring to one’s parents, parents’ parents, etc.), and geographic origin (in particular in relation to continents, i.e. Asia, Africa, America or Europe). Even if the category of ‘race’ is controversial,[[2]](#endnote-2) it is used across disciplines to draw out questions on social justice and health. Some scientists use ‘race’ to study how physical features, ancestry and geographic origin matter for socio-economic phenomena, such as education, financial or social achievement, legal rights and benefits, etc. Bioscience experts use ‘race’ to think about how the same aspects of race relate to biomedical phenomena, such as disease-associated phenotype or genotype, evolutionary process, etc.[[3]](#endnote-3)

Interdisciplinary science needs not negate context-specific understandings. It rather makes differences meet on some common ground. The problem though now becomes how to find such a common ground, i.e. how disciplines can communicate with each other without talking at cross purposes. Coming from different disciplinary backgrounds, practicing different styles of research, adopting conflicting work cultures no doubt turn communication into a challenging pursuit:

communication involves the integration of two or more disciplinary languages with the aim of generating a common understanding” (Holbrook 2013, 1869)

Communication is an action, and integration is its driving force. But integration (in the sense of ‘uniting’ or ‘combining’ into a unified system, in Piaget’s sense) does not entail achieving an outcome of sameness. We still need to preserve differences and capitalize on their contributions to overall understanding. How can differences be integrated without losing their specific input? Besides, differences are sometimes so radical (almost incommensurable) that integrating perspectives becomes a difficult if not impossible task to achieve. And yet it is often because of the limited resources of one tradition of research, or of one discipline, that we need to look outside the borderlines of a single discipline – in order for example to solve some problem which a disciplinary paradigm might not be well equipped to handle.[[4]](#endnote-4) This does not mean necessarily the end of cooperative research. To the contrary, researchers from different paradigms encounter the same problem of searching for ways that allow them to communicate. In the practice of research, they often develop further special languages through day-to-day exchanges or negotiations among discipline-specific terminologies, ending into project-specific or other context-specific vocabularies. Here a further aid to imagination is put forward by the already mentioned Galison (1997): the expression ‘trading zones.’ The expression, widely used in anthropological studies, refers to real situations in which different peoples are able to exchange goods, despite differences in their language and their culture.[[5]](#endnote-5) By analogy it is used to point at how scientists from different paradigms and different communities can find a way to collaborate/coordinate with each other despite their differences, and to exchange knowledge across disciplinary boundaries. Developing new languages and new ideas in interdisciplinary settings demonstrates the need for finding wider systems of understanding and effective tools for making communication among disciplines and fields of enquiry a realistic and desirable outcome.

Interestingly, interdisciplinarity in research concerns not only the scientific disciplines traditionally conceived, but a wider range of fields of knowledge and expertise dealing with issues of value, ideology, political foresight, policy, public perception, etc. which – far from being mere accessories of research – contribute, each in different ways, to developing scientific knowledge both in the realm of its production and in that of its use/uses.[[6]](#endnote-6)

**Philosophy: applied or engaged?**

So far I have argued that 1) the type of knowledge most accredited within knowledge societies is science based; 2) the science base of this knowledge is characteristically interdisciplinary, both in an ontological sense (science deals with ‘boundary objects’) and in a methodological one (these objects of research entail negotiations of understanding/communication or ‘trading zones’ for their analyses); 3) that interdisciplinary research as conducted in practice requires a combination and integration of different perspectives (both epistemic and non epistemic) and forms of expertise. Given this picture, we can now ask whether, against this backdrop of research, there is any room for philosophical investigation. What role, if any, can philosophy play? What tools, what type of expertise, can philosophy make available to the practice of science and to its use in society?

It has been intimated that philosophy in the XXI century should stop being insular and start ‘dedisciplining’ itself. (Frodeman 2013) Philosophers should acquaint themselves with different types of expertise (different from their own) in order to be able to work with other professionals and learn to converse with them.

Philosophy must consist of roughly equal parts internal and external thinking – in-house conversations, and comprehensive accounts of issues shared with those outside the disciplinary philosophical community.’ (Frodeman, 2013, 1920 )

But this means that philosophers must become:

active *participants* in ongoing debates on policy problems, working on the project level with scientists, engineers, policy makers, public agencies, and community groups. Philosophers need to get out of the study, and into the field. (Frodeman 2013, 1918; quoted from Frodeman 2010)

In other terms, philosophy might come to play the role of the *integrating element* (Frodeman 2013, 1919) across the disciplines it engages with, and become itself an applied practice. But ‘applied’ in what sense? And what is it actually entailed by philosophy becoming ‘applied’?

There are several conceptions of what applied philosophy is, as there are different views about what philosophy can apply to (e.g. Lippert-Rasmussen2016 distinguishes among seven senses of ‘applied’). A conception that suits the types of issues we have been discussing so far goes under the name of ‘relevance conception.’ Leslie Stevenson put forward this view in his (1970) article, which takes its cue from an insightful quotation from Wittgenstein:

What is the use of studying philosophy if all that it does for you is to enable you to talk with some plausibility about some abstruse question of logic, etc. and if it does not improve your thinking about the important questions of everyday life …? (Wittgenstein quoted in Stevenson 1970, 258)

By applied philosophy Stevenson means philosophy that is ‘relevant’ to questions of everyday life, ranging from “existential ones such as why death is bad to political questions such as what we should do about global warming.” (Lippert-Rasmussen 2016, 4) But being relevant in this case does not only imply taking certain topics into account and turning them into ‘philosophical objects’ of inquiry. Relevance entails *sensitivity* towards these topics – non just in the sense of ‘caring’ about them, but in the sense of a willingness to adjust philosophical conceptualisation and argument to the epistemic (and non epistemic) needs of the topics addressed as relevant. And here, I believe, some of the lessons learnt from the analysis of interdisciplinary research become useful. First, making a topic relevant to philosophical investigation does not mean analysing it in exclusively philosophical terms, but making it fruitfully interact with all the disciplines and domains of inquiry which might also prove relevant to understanding it. Relevant topics of inquiry are boundary objects precisely in this sense. Secondly, in order to acknowledge interaction, disciplines must be prepared to change, modify, adapt their conceptual and methodological apparata to meet the epistemic (and non epistemic) needs of the topic under investigation. By so doing the field of inquiry becomes a ‘trading zone’, where communication across disciplines is made possible not only by making different domains of expertise available to the general understanding of a topic but by being prepared to modify the resources of analysis from the different domains to fit the very topic under investigation, and address the specific issues it raises.

Especially when philosophy applies to socially relevant contexts it cannot just be plainly ‘applied’. It should ‘engage’ with those contexts and accept the challenge of being transformed in the process. As Douglas (2020) for example argued for the specific case of the philosophy of science, being philosophically ‘engaged’ with science-driven, socially-relevant questions should not and cannot reduce itself to a ‘mere application of philosophical ideas off the shelf.’ (Douglas 2020, 322). On the assumption that there are issues arising from contexts of practice that can benefit from philosophical attention, the way in which the philosophical community can best serve the purpose of analysis should be appropriately conceived, rather than expecting that the narrow focus of a discipline is able to carry through that purpose independently of broader practical challenges. Accepting these challenges does not betray the very identity of the philosophy of science as it came to be formulated originally (1930s) as a discipline. Douglas reminds us of how this field of philosophical inquiry used to include ‘not just arguments about confirmation, probability theory, or scientific explanation. It also included work on the relationship between science and democracy, the role of scientists in policy making and the place of values within the practice of science.’ (Douglas 2020, 320)

So, what does ‘engagement’ mean within this framework of analysis, and what consequences does philosophical engagement entail for practicing philosophy? I will illustrate by means of two examples from the philosophy of science, which I am familiar with.

**Illustration I: Evidence and evidence for use**

The topic of evidence is one of the most discussed in philosophy of science. Scientific evidence is, according to the received view, that body of factual information able to support and justify a belief concerning the truth of some conjecture. It is not enough to imagine how things might be. Even if it makes much sense to imagine or conjecture that things are a certain way, we need to be able to prove that they are that way, that we are right in explaining them in a certain way. This is what distinguishes knowledge from fiction.

To establish whether a hypothesis is true, credible, trustworthy, in science we proceed by looking at a pool of data and empirical reasons that function as evidence for the hypothesis under scrutiny (evidence that can confirm or disconfirm it). To say that a result is acceptable in science is, according to the same view, equally to say that it is supported by adequate *evidence*, that it is justified by facts that are at the same time true and relevant.

In the philosophy of science literature the concept of evidence is normally described in probabilistic terms. Philosophical theories of evidence focus on the probabilistic relations between evidence and hypothesis. For example, many accounts demand that, for *e* to be evidence for a hypothesis *h*, eshould increase the probability of h: P(h/e) > P(h/¬e). In other words, probabilistic theories of evidence strive to attach degrees of certainty to a piece of evidence, ensuring – by so doing – that evidence, as they define it, does what it is supposed to do, i.e. providing grounds for belief in h.[[7]](#endnote-7)

To ensure that evidence does its job properly and accurately, traditional philosophical theories mainly focus on issues of *truth* (namely, the reliability of the empirical facts used as evidence), as well as of *quality* (the question of how good as evidence a piece of information is in supporting a certain hypothesis, and of how good or better the hypothesis is because of the evidence), and of *efficacy* (how good evidence is under ideal or controlled circumstances, e.g. an experiment or a trial).

Let us now ask ourselves the following questions: can these theories appropriately ‘apply’ to a practical context such as that of, say, the formulation of a policy? Would the very same theories be suitable to assess the role and value of scientific evidence in such context? The first thing that we might notice is that the order of priorities is not the same in the new context, so that these theories – as we know them – might not be of real help. We need further concepts to describe what is going on. To start with, in policy making we already know that evidence for a policy conclusion should make the conclusion probable. But if evidence is to make a policy conclusion or recommendation probable, what needs to be established beforehand is, for example*, what kinds* of facts are needed for making the conclusion probable; what makes these facts *relevant to* the conclusion they are meant to support; how these facts *combine* with a whole array of other facts and factors brought forward by the circumstances addressed by the policy in question; etc.

A second thing we might point out is that in practical contexts the purpose of producing evidence is not to support the acceptance (or rejection) of a hypothesis with (high) probability. This is because we often find ourselves making decisions before such probability can be provided, or even when such probability is unforeseeable (there are contexts in which only evidence produced in a less than rigorous way might be available). Arguably, in practical contexts (including policy contexts) non-conclusive and less than rigorous evidence might be better than no evidence at all. Even if we cannot do the job perfectly, there is still a job to be done. Value judgements might for example enter in deciding whether some evidence is to be used, and how to use it. (Douglas 2010; Montuschi 2017a) They might also help in accepting ‘new evidence’, evidence which – though not yet well established at a particular time – might still ‘speak in favour of or against’ a certain conclusion. This does not necessarily downplay the role that evidence has in making the decision, but it does require that we rethink the way in which that role is played.

A third consideration to raise is that whether or not an intervention can work under ideal conditions (e.g. within the boundaries of a ‘randomised control trial’) this is no guarantee that the same intervention would or would not work in a real-world type of situation. To the contrary, whether or not an intervention is effective in the real world might depend on reasons and/or conditions other than those which make it work in the ideal situation. This means that what needs to be addressed is how, and whether, such a transition from the ideal to the real can be made, and what (if anything) makes it possible.

Finally, in practical contexts rarely only one piece of evidence can be conclusive, even when this is produced by following so-called ‘golden rules.’ Evidence brought to the fore by the best methods (in a sense of ‘best’ normally qualified in terms of rigour, formal consistency, etc.) is not necessarily best evidence, let alone the only relevant evidence. A typical illustration is legal evidence. Legal cases involve a rich mass of evidence of various and different types. Most evidence will be unquantified, and at times it may be hard even to determine precisely what the evidence is (e.g. a witness’s demeanour). But even in cases where quantified evidence is involved (e.g. DNA match probabilities in criminal cases), this might still require to be weighed against, and combined with, qualitative, ‘softer’ evidence so that a final verdict becomes fair only when it takes into account different types and sources of evidence, and is issued ‘on balance’.

‘On balance’ is an important but tricky connotation. On the one hand, it alerts us to the necessity of not excluding evidence which might, despite the way in which it is formulated, prove relevant to assessing a certain hypothesis. On the other hand, it brings up the problem of how a balance of evidence is to be pursued. Combining pieces of evidence is not automatic, nor simple. It must be method driven. But what methods of combination are to be used? Aggregation? Bayesian nets? Literature reviews? Etc. Etc. The choice is vast, and yet none of these methods might on their own capture exhaustively the type of ‘balanced’ combination we are after in particular contexts.

Ultimately, when we evaluate evidence from the point of view of its use in practical contexts, a whole series of issues are brought to specific philosophical attention:

1. *relevance over quality* (it is questioned how a certain piece of information becomes/proves to be evidence of a certain hypothesis before dealing with the question of how good that evidence is)
2. *effectiveness as distinct from efficacy* (it is questioned how, and how well, an acquired piece of evidence ‘travels’ from the ideal/artificial settings of, say, an experiment, to a practical/wider/relatively uncontrolled or open context)
3. *uncertainty of evidence vis a vis degrees of certainty* (a wider array of methods for acquiring evidence is to be taken into account than only those which purportedly secure evidence by virtue of the very way they are designed; and not all the methods to be included as potential sources of evidence are able to guarantee their conclusions, that is to make conclusions certain)
4. *combination of different sources of evidence rather than golden rules* (what counts as evidence is ultimately a judgement reached ‘on balance’, by weighing and comparing the different and differential pieces of information which bear on a certain result, rather than simply what a method that ‘works best’ suggests as being ‘best evidence’, or best ‘aggregated’ evidence).

It is then part of the same questioning to reflect on and explain why, in a context of use, relevance needs to be assessed in advance of truth (what facts actually speak in favour of a policy), efficacy is no guarantee of effectiveness (the internal validity of a method does not automatically mean that the same method is valid externally, that its conclusions can be generalized), uncertainty is not necessarily a deterrent against the use of evidence (non-conclusive evidence has a role to play in practice), or how a combination of different sources of evidence to support a policy might be a better bet (though difficult and problematic to articulate) than the use of a ‘golden rule’ method.

Paying attention to these features of evidence (relevance, effectiveness, uncertainty, combination) is precisely where the question of use, and of practical application, imposes due re-adjustments on a philosophical analysis of the concept of evidence and requires, at the same time, that this analysis interacts with all those domains of expertise related to the different potential sources of information. There is more to evidence than believable facts, artificially controlled question-setting, and ideally designed methods or aggregated data collection. Specific issues concerning background assumptions, context and application all come to the fore in view of redefining the borderlines of assessment and evaluation for a concept that must prove to be of real use in practice. Philosophy can help in practice, if it is able to take interdisciplinarity in the direction of ‘engagement’ as illustrated so far. Off-the-shelf philosophical terminology (such as ‘evidence’, or as we see in the next section, ‘objectivity’) should not endorse off-the-shelf solutions to meet the specific challenges and expectation of practice – or at least so should reason an ‘engaged’ philosopher of science.[[8]](#endnote-8) Conversely, an understanding of the benefits of pursuing philosophical engagement in the way suggested becomes an almost mandatory task for all those who are involved in making decisions on the basis of socially relevant knowledge.

**Illustration II: Objectivity, scientific and practical**

Another widely discussed topic in the philosophy of science is objectivity. Science is of course the model field of objectivity. There are ontological, methodological and epistemological reasons that conjure up this image (science addresses the way the world really is, science has the proper means to offer an adequate representation of this world and to exclude everything that might interfere with scientific knowledge). How the objectivity of science is portrayed in philosophy of science is far from uncontroversial. There are countless attempts at giving a precise definition of scientific objectivity, to the point that some even despair that such a definition can ever be attained and argue that the very concept should be dispensed of, as for ex. Hacking (2015). However, what all these attempts have in common is that they mainly concern the context/s where science is *produced* and what their impact is for the objectivity of science itself. It is for example discussed whether the facts science deals with are real or ‘constructed’ by its theories, what it means for scientific inquiry to be value-free or value laden, or whether some methods are better equipped ‘in principle’ to acquire objective results. What happens instead when purportedly objective scientific results are used outside the realm of science? Would it be appropriate to burden science with the responsibility of making a policy decision *in the relevant sense* objective? Is the narrow meaning that we attribute to objectivity in the field of science sufficient and appropriate to take on board the range of issues presented by contexts other than science? How can we question whether a practice, say making a policy decision, is ‘objective’? Is the same concept of objectivity at stake? Or even, in the absence of a well-defined idea of what objectivity is in the field of practice, would it be enough, and/or appropriate to adopt for policy making the same ideal of objectivity we attribute to science (whatever that turns out to be in the field of science, out of the range of definitions pursued within that field)? These are some of the questions that an ‘engaged’ philosophical inquiry should be prepared to take on board and provide specific answers to. I have discussed some of these issues elsewhere (for ex. Montuschi 2017a). Here it suffices to recall a few pointers that make us realise how asking the right questions about a complex concept such as objectivity requires both philosophical skill and practical awareness if the concept is to work appropriately within a context of application (not necessarily scientific application). As in the case of evidence, there are no shortcuts here either, nor off-the-shelf solutions.

First, using the objectivity of science (whatever definition we decide to adopt within the realm of science) as a model for, say, the resolution of a conflict of opinions pertaining a social practice (say, the efficacy of a vaccine in controlling the spread of a disease) requires a specific, as well as more inclusive, critical conception of what is correct and reasonable to use in the circumstances under scrutiny. A scientific claim is different from a policy decision. What makes the latter ‘objective’ includes reference to features and considerations that go well beyond scientific evidence.

To give an example: if a policy decision does not properly take into account the social framework wherein the decision is taken – which includes a series of issues that transcend the objectivity of the information advanced by science – the worry is that the decision might not be inclusive enough, complete, just. Ultimately, fairness is one aspect that sits well in a definition of ‘practical’ objectivity but might be irrelevant in a definition of scientific objectivity. Conversely, if we expose the facts of science to considerations of policy fairness, we might be concerned that science loses objectivity in its assessment of facts. Well assessed facts come first in a definition of scientific objectivity, but confront practical objectivity only after questions of relevance, use and purpose of facts have been settled, or at least addressed (see Montuschi 2017a, 18). This does not mean that scientific objectivity and what we could call ‘practical objectivity’ simply go in different directions. Quite the opposite. It is the context of application that makes us realise that only specific features of objectivity travel from one context to another, that some make their appearance because of the very context, and that the contextually emerging features must, ultimately, suitably combine in view of what we intend to achieve within that very context.[[9]](#endnote-9)

So, here is a second pointer. The tension between different aspects of objectivity calls for an appropriate investigation of a concept of ‘balance’ that, as in the case of evidence, can help overcome potential conflict and align differences within a context of application. Philosophical analysis proves useful here. If the aim is to frame a concept of objectivity able to include the different aspects relevant to a context of application – an objectivity ‘on balance’ – how should we proceed? In the absence of strict rules (policy contexts by norm address open environments where ‘manuals of use’ are often not effective) we need to achieve coherence among aspects by relying not on their logical features but on concrete local conditions and specific circumstances – on ‘support factors’ as they have been defined by Cartwright and Hardie (2012, 25) – that jointly team up to achieve coherence in specific contexts (and for that particular context). And in the absence also of clear standards of measurement for this type of contextual coherence, we normally rely on a good deal of expert judgement, that is on a form of reasoning that is not strictly speaking deductive (therefore ensuring validity and certainty) but that it comes about by considering and pondering over all sorts of matters pertaining the case under scrutiny and ultimately by ‘deliberating’ towards a decision.

And here a third pointer becomes useful. Deliberation and judgement do not only belong to a practical realm such as policy making. Science is froth with uncertainty, and this also requires judgement and deliberation. To use an example from Douglas, is dioxin carcinogenic to humans? At what degrees? In what circumstances? What triggers its detrimental effects on humans? The science is not conclusive on any of these questions. Still: “Despite the uncertainties, scientists will be called upon to provide their best accounting of dioxin’s risk”. (Douglas 2004, 58) Or to refer to another example, are badgers significant carriers of bovine tuberculosis? Is the disease spread significantly by badger movements? To what degree? In what circumstances? (Montuschi 2017a). Scientists disagree on the answers to be offered. So decisions have to be made as to what uncertainties to emphasise and what to leave aside; what methods to use; what data to select and how to interpret them; what constitutes sufficient warrant in particular cases; how to evaluate the risk or the impact of error outside lab research or controlled studies; etc. etc. Making judgements of this sort often entails value-driven choices – where the values in question are not only cognitive or epistemic, but also ethical and social (Douglas 2000, as recounted in Montuschi 2017b). If then both the short- and long- term aim is to articulate the most objective answer possible, we cannot simply ‘read it out’ from the way science pursues reliability for its own results and discoveries (that is, taking science as the repository or absolute benchmark of objective answers). We also cannot draw a straight line of derivation from science to decision making, where instead we should pay attention to the deeply tangled and contested path that links science to policy. As in the case of evidence, and as suggested above, a good philosophy of science in practice should tell us how to avoid simplistic shortcuts and warn us against ‘off the shelf’ solutions. This goes to the advantage of both science and policy in democratic knowledge societies. Investing on this type of understanding is not a wasteful, idle pursuit.

**A brief epilogue**

Engaging philosophy with practice requires adaptation and transformation, well beyond application. The result of this process is beneficial both to philosophy as a style of investigation and to the understanding of the practical issues philosophical analysis is asked to address. The result is, in other terms, both epistemically and socially beneficial. To go back to where we started, I conclude with Williams’ words again:

The Humanities are concerned with a truthful understanding of what we are and where we have come from, and they, above all, demand a truthful understanding of themselves, and hence a truthful justification of their value. Moreover, society itself and those who are trying to run it also need those understandings. For it is only those understandings that can issue in reasoned demands for change, and the alternative to reasoned change is, as always, not no change, but unreasoned change, which will destroy not only the Humanities but the society that forgets about them. (Williams 1987, 189)

It is the core of the argument supported in this paper that an engaged approach to philosophy is part and parcel of truthful (and profitable) understanding, and of a demand for reasoned change.

**References**

Alexandrova, Anna. 2017. *A Philosophy for the Science of Well-Being*. Oxford: Oxford University Press.

Cartwright, Nancy et al. 2008. “Evidence-based policy: Where is our theory of evidence?” In A. Beckermann, H. Tetens and S. Walter (eds.) *Philosophy: Foundations and Applications.* Paderborn: Mentis-Verlag.

Cartwright, Nancy and Hardie, Jeremy. 2012. *Evidence-Based Policy: A Practical Guide to Doing it Better*. New York: Oxford University Press.

Cartwright, Nancy. 2021. “Will This Policy Work for You? Predicting Effectiveness Better: How Philosophy Helps.” *Philosophy of Science*, 79, 5.

Cerroni, Andrea. 2007. “Individuals, knowledge and governance in 21st century society*.*” *Journal of Science Communication.*

Douglas, Heather. 2000. “Inductive Risk and Values in Science.” *Philosophy of Science*, 67.

Douglas, Heather. 2004. “Prediction, Explanation, and Dioxin Biochemistry: Science in Public Policy.” *Foundations of Chemistry* 6.

Douglas, Heather. 2010. “Engagement for progress: applied philosophy of science in context.” *Synthese* 177, 3.

Dupré, John. 2012. *Processes of Life: Essays in the Philosophy of Biology*. Oxford: Oxford University Press.

Efstathiou, Sophia and Mirmalek, Zara. 2014. “Interdisciplinarity in Action.” In N. Cartwright and E. Montuschi, E. *Philosophy of Social Science.* Oxford: Oxford University Press.

Frodeman, Robert. 2010. “Experiments in field philosophy”, *New York Times* op-ed, part of the stone series 2010. Accessed November 23, 2010 from: <http://opinionator.blogs.nytimes.com/2010/11/23/experiments-in-field-philosophy/>

Frodeman, Robert. 2013. “Philosophy de disciplined.” *Synthese* 190, 11.

Galison, Peter. 1997. *Image and Logic*. Chicago: University of Chicago Press.

Goldenberg, Maya J. 2006. “On Evidence and Evidence-based Medicine: Lessons for the philosophy of science.” *Social Science and Medicine* 62, 11.

Hacking, Ian. 2015. “Let’s not talk about objectivity.” In F. Padovani, A. Richardson, J.Y. Tsou, (Eds.), *Objectivity in Science*. New York: Springer.

Hess, Charlotte and Ostrom, Elinor. 2007. *Understanding Knowledge as Commons*. Oxford: Oxford University Press.

Holbrook, J. Britt. 2013. “What is interdisciplinary communication? Reflections on the very idea of disciplinary integration.” *Synthese*, 190, 11.

Kaplan, Jonathan M. and Winther, Rasmus G. 2014. “Realism, antirealism, and conventionalism about race.” *Philosophy of Science*, 81, 5.

Lippert-Rasmussen, Kasper. 2016. “The Nature of Applied Philosophy.” In K. Lippert-Rasmussen, K. Brownlee, D. Coady (Eds)*, A Companion to Applied Philosophy.* Oxford: Wiley-Blackwell.

Norman, Malcom. 1958. *Ludwig Wittgenstein: A Memoire.* Oxford: Oxford University Press.

Montuschi, Eleonora. 2009. “Questions of Evidence in Evidence-Based Policy.” *Axiomathes*, 19, 14.

Montuschi, Eleonora. 2017a. “Using Science, Making Policy: What Should we Worry About?” *The European Journal for the Philosophy of Science* 7, 1.

Montuschi, Eleonora. 2017b. “Scientific Evidence vs. Expert Opinion: A False Alternative?” *Politeia*, special issue “Science and Democracy”, XXXIII, 126.

Montuschi, Eleonora, 2020. “Finding a Context for Objectivity.” *Synthese,* DOI: 10.1007/s11229-020-02969-6.

Nussbaum, Martha. 2010. *Not for Profit.* Princeton: Princeton University Press.

Piaget, Jean. 1972. “L'interdisciplinarité - Problèmes d'enseignement et de recherche dans les universités.” *Proceedings*, Paris: OCDE.

Spencer, Quayshawn. 2014. “A radical solution to the race problem.” *Philosophy of Science,* 81, 5.

Star, Susan L. and Griesemer, James R. 1989. "Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39." [*Social Studies of Science*](http://en.wikipedia.org/wiki/Social_Studies_of_Science) 19, 3.

Stehr, Nico. 1994. *Knowledge Societies.* London: Sage Publ.

Stevenson, Leslie. 1970. “Applied Philosophy.”, *Metaphilosophy* 1, 3.

Williams, Bernard. 1987. “What Hope for the Humanities?” *Educational Review*, 39, 3.

1. To use as illustration their example of the maps of the state of California: “The maps of California created by the amateur collectors and the conservationists resembled traditional roadmaps familiar to us all, and emphasized campsites, trails and places to collect. The maps created by the professional biologists, however, shared the same outline of the state (with the same geo-political boundaries), but were filled in with a highly abstract, ecologically-based series of shaded areas representing ‘life zones’, an ecological concept. Starr and Greisemer, 1989, p. 411. [↑](#endnote-ref-1)
2. ‘Race’ is, and has been for a long time, at the centre of a wide and articulated debate on its alleged biological basis, with positions at the opposite sides of the spectrum (se for example among many, Spencer 2014 vs Kaplan 2014) and several others in between. Addressing this debate is not part of the argument of this paper. For a good review of positions see for ex. Dupré (2012). [↑](#endnote-ref-2)
3. Another example of a widely debated social object of inquiry is that of ‘well-being’. When we use the expression ‘well-being’ to refer to the happiness of a nation, do we refer to the same concept that we use when we talk of the ‘well-being’ of, say, children or the aged? In measuring ‘well-being’ different disciplines (psychological sciences, development economics, gerontology and medicine) purportedly ‘measure’ different things. See Alexandrova (2017). [↑](#endnote-ref-3)
4. This is the classic situation that T. Kuhn describes when anomalies arise in the context of a scientific paradigm and the resources of normal science show their limits in solving arising challenges. As is well known, Kuhn denies that the situation can be handled in cooperative ways among paradigms, and the only response is a crisis that ends up in a scientific revolution. [↑](#endnote-ref-4)
5. "Two groups can agree on rules of exchange even if they ascribe utterly different significance to the objects being exchanged; they may even disagree on the meaning of the exchange process itself. Nonetheless, the trading partners can hammer out a local coordination, despite vast global differences. In an even more sophisticated way, cultures in interaction frequently establish contact languages, systems of discourse that can vary from the most function-specific jargons, through semi-specific pidgins, to full-fledged creoles rich enough to support activities as complex as poetry and metalinguistic reflection." (Galison 1997, p. 783) Galison uses the expression to illustrate how, for example, physicists and engineers communicate with each other and collaborate when developing radars and particle detectors. [↑](#endnote-ref-5)
6. An insightful illustration of this point comes from the field of climate science and policy. The debated issue of how to calculate the value of discount rate to apply to future generations (in view of deciding how urgent immediate action is to stop carbon emissions), and the discrepancies in the figures put forward for the rate, can be at least partly brought back to the differences in the ethical perspectives that inform those calculations. See for example the debate between Stern and Nordhaus as analysed in detail in Montuschi (2014). [↑](#endnote-ref-6)
7. For a discussion of these issues see Cartwright et al. (2007), and Montuschi (2009). [↑](#endnote-ref-7)
8. An example of this attitude can be found in Goldenberg (2006), who shows the detrimental effects of taken for granted definitions of evidence and objectivity in the applied field of evidence-based medicine. [↑](#endnote-ref-8)
9. On the relevance of context for pursuing objectivity see Montuschi (2020). [↑](#endnote-ref-9)