On Intellectual and Instrumental Values in Science

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Abstract

This opinionated essay discusses the role of intellectual and instrumental values in scientific fields, and the way these values evolve due to internal and external forces. It identifies two sources of the decline of intellectual values within a scientific field: (1) the direct intervention of outsiders in the dynamics of (successful) scientific fields, and (2) the decline of intellectual values in the society at large.

Preface: This essay expands on the general discussion part of my prior essay entitled *On the status of intellectual values in TOC*. The latter essay combined an (opinionated analysis of an) empirical social study of the change in values in TOC with a general discussion of the role and dynamics of intellectual and instrumental values in scientific fields. The current essay focuses on the general discussion, while clarifying and expanding it.

The core of the discussion, presented is Section 4, identifies two causes for the current decline of intellectual values in scientific fields. This discussion refers to the sociological notion of values and their roles in social groups (briefly reviewed in Section 2) as well as to a conceptualization of Science as having an intellectual face and an instrumental face (cf. Section 1).

1 The Two Faces of Science

Science is a systematic enterprise aimed at building and organizing rational knowledge about the natural and the human environment. Science is partitioned into scientific disciplines (or fields), which are each defined as the study of a specific type of phenomena (or specific aspects of the environment).

Each scientific discipline has two *faces*: An intellectual face, which corresponds to an *interest in understanding a specific type of phenomena*, and an instrumental face, which corresponds to an *interest in using such an understanding in order to predict and/or affect* (or manipulate) *the environment*. These two "faces of science" are intimately related. It is widely accepted that a test of good understanding is its predictive power (which refers to predicting the normal course of the evolution of the environment or its evolution under planned intervention). The other direction is even more obvious: Non-trivial prediction depends on some understanding of the situation.

The two faces of science are reflected in the classical dichotomy between *basic* (or *pure* or *theoretical*) research and *applied* (or application-oriented) research. In some cases, the dichotomy is institutionalized by a historical division of a discipline into two corresponding disciplines, but even when such a divide does not exist one typically characterizes works as "theoretical" or "applied" (or mixed). On the other hand, works that are labeled "theoretical" may turn out to have applied

implications, and vice versa. The same, and actually more so, holds with respect to the initial motivation for a particular research as compared to the impact of its results. In summary, the above dichotomy is conceptually useful, although it does not correspond to a clear divide in reality itself.[1]

Historically, the quest for understanding (i.e., the intellectual interest) grew out of the desire to predict and/or manipulate the environment (i.e., the instrumental interest). Still, conceptually speaking, the intellectual face of science has priority over its instrumental face, and historically the quest for understanding has acquired an autonomous status. This conceptual (rather than historical) priority stems from two facts. First, obviously the utilization of an understanding presumes that it was already obtained. Second, each scientific field is defined as the study of a certain type of phenomena, rather than as a study of the possible uses and effects of these phenomena. For example, Physics is defined as the study of matter, motion, energy, and force; Biology as the study of living organisms; TOC may be defined as the study of efficient computation; and Sociology as the study of societies.[2]

2 Values in Science

Values play an important role in any social group, and Science (as a social institution) is no exception. The values (of a social group) are the central standards of good (and bad), desirable (and undesirable), and beautiful (and ugly) that are widely-agreed by the group members. Indeed, typically, these agreements reach a point that these standards are taken for granted (by the group members). The values reflect and are reflected in the structure and in the activities of the group; they provide coherence to these activities, and smoothen the interactions between the group's members. In other words, common values are central to the social processes that transform a set of individuals into a social group. This holds for Science at large as well as for each scientific field.

The two faces of science are reflected in two corresponding value-clusters; the intellectual cluster, pivoted at values such as curiosity, study, and understanding, and the instrumental cluster, pivoted at values such as applicability, measurable achievements, and technical competence.[3] Indeed, the intellectual and instrumental value-clusters are closely related, and both clusters are pivotal to Science. Still, the corresponding values are not identical, and an overemphasis on one cluster at the expense of the other cluster is bound to harm the development of a discipline. In particular, as will be discussed in the next section, the decline of the intellectual cluster endangers the driving force of Science (i.e., its very soul).

In continuation of Note 3, we stress that scientific research is a highly intellectual activity (in the colloquial sense of this word), regardless of whether or not it is motivated by intellectual values (rather than by instrumental ones). This essay, however, is focused on the motivations that underly research, not on the actual research activity nor on its consequences (which may differ from the one intended). Hence, throughout the essay the term "intellectual" refers to the *motives* (or motivation)

[1] Indeed, conceptual dichotomies regarding human activity rarely correspond to perfectly separated domains of activity.

[2] Indeed, engineering disciplines may differ here, but also in them the study the phenomena themselves play a key role.

[3] N.B.: It is not that certain values are deemed "intellectual" (in the colloquial sense, while other values are not), but rather than the *intellectual value-cluster* is defined as consisting of certain related values. Of course, the choice of the word used at the target of the definition is supposed to evoke some associations borrowed from the colloquial use, but the actual definition is the one that counts. In particular, note that the phrase *intellectual value-cluster* is a compound noun not an adjective applied to a noun. Ditto for *intellectual values*.

for research, not to the actual research *activity*, which is highly intellectual regardless of whether its motives are intellectual or instrumental.

The intellectual and instrumental values are central to all scientific disciplines, but indeed the balance between them may be different in different disciplines and at different times. Moreover, the desired balance between these value-clusters is typically a matter of controversy within many fields. What is typically not controversial but is rather agreed upon, within each scientific discipline, is the belief in the importance of the discipline's own research activity (i.e., the importance of the phenomena that it studies and the adequacy of its methodology). Indeed, this belief is the most central value of this discipline.

3 The Importance of Intellectual Values

In light of sour state of affairs to be discussed in next section, it seem appropriate to justify the assertion that *the intellectual value-cluster is the driving force of Science*, and so may be thought about as its soul.

The justification is rooted in the fact that each scientific field is defined as the study of a certain type of phenomena. Thus, the very definition of the discipline refers to an interest in understanding certain things, and the discipline is structured and unified around the quest of such an understanding. This quest is the ideal of the intellectual value-cluster; put differently, the intellectual value-cluster promotes the quest of understanding as its main ideal. Hence, the intellectual value-cluster is the driving force of each scientific field.

It should be stressed that real values (as opposed to ones that are only proclaimed) have a deep influence on the behavior of the group members, which are expected to conform with these values. On the other hand, wide-spread and common behaviors that conflict with some values diminish the standing of these values. In other words, there is a feedback between values and behavior; *values are the crystallization of the principles underlying behavior*. Hence, the former may be read as a shorthand for the latter, and so the issue at hand is the standing of the quest of understanding within the scientific discipline.

4 The Change in the Standing of Intellectual Values

As hinted in prior sections, although the intellectual and instrumental value-clusters complement one another, there is often a conflict between them. Struggles regarding the relative importance of intellectual and instrumental values take place in each scientific field, and are part of the normal evolution of each field. These struggles are typically related to the evolution of the actual contents of the field, e.g., to the emergence and decline of certain research directions, and to change in importance attributed to certain conceptual frameworks, research paradigms, and results. In this case, these struggles are viewed as internal, and they are typically resolved in the field itself (i.e., via the research activity itself, not in essays like this one).

This essay is concerned with changes in values that are induced and/or effected by external circumstances, where external effects are viewed as any effect that is not internal (i.e., does not arise from the evolution of the contents of the field). In such a case, it makes sense to call attention to these changes aned advocate opposing them, an advocacy that may be viewed as an external action (even when taken by an insider).

This essay call attention to two external effects that push fields away from their intellectual values. The first effect is the dynamic of the evolution of (academic) fields within the society at large.

The basic claim is that when a field becomes more successful (or, actually, is considered so from the outside), the competition within the field intensifies, and this creates pressures towards "objective" measures of accomplishment that can be reviewed from the outside. Such measures are typically oblivious of intellectual contents, whereas they are easier to compute with respect to instrumental contributions. Thus, under the reign of (externally monitored) competition, intellectual values decline. (The argument is further articulated below.)

The second effect focuses at the society itself and on the effect of the Zeitgeist on any activity that takes place in it (including scientific research). Specifically, the claim here is that intellectual values are in decline in the Western society for more than one hundred years, and that the decline has become more and more drastic with time. (Again, this argument is further articulated below.)

4.1 The dynamic of the evolution of (academic) fields

The following analysis is rooted in the general theory of the evolution of (academic) fields, developed by Bourdieu (in a sequence of works in the 1970's and 1980's). According to this theory, an academic field emerges when a group of thinkers (typically academics) develop an interest in a new type of questions, which are not addressed by any other (academic) field. The field is relatively autonomous (with respect to the society at large as well as towards other fields). It is defined by its specific activities and/or interests, has its own internal structure and its own symbolic capital, which is subject to conflict and struggle.[4] This symbolic capital (typically represented by prestige and hierarchy) is not reducible to economic capital and its translation (or transformation) to economical capital is far from immediate.

When a field manages to attract the attention of many people outside it, it is considered successful and the value of its symbolic capital increases (in the perception of society at large). At such a time, the internal struggle on command of the field's symbolic capital *intensifies*: The initial interests are forgotten (or become less important), and the focus moves to a (vulgar) competition on symbolic capital. Indeed, competition is a vulgar form of culture, which degenerates any field of science (or art) in which it becomes dominant. The essence of competition is shifting the focus from the primary and intrinsic interests of the field (i.e., its questions) to secondary and external artifacts used in the competition. The latter artifacts should be easy to compare, and the focus on this comparison is instrumental by nature.

The competition in a successful field intensifies because of the interest of external people (i.e., outsiders) in its outcome (i.e., the distribution of symbolic capital, which becomes translatable to externally bestowed benefits).[5] The outsiders' interest in the result of the competition causes their interest in administering (or just observing) the competition. In order for the competition to be administered (or just observed) by such outsiders, it must take a form that these outsiders can understand. Thus, the competition must refer to things that outsiders can compare. Various publication statistics are indeed a good example, and no wonder that they appeal to outsiders (e.g., deans) much more than to real experts. In general, outsiders seek "objective-looking" measures,

[4] This struggle reflects the dynamics of the field; that is, the emergence of new ideas and the progress in coping with the field's problems. Thus, this struggle (over symbolic capital) is aligned with the field's intrinsic interests in its own problems. Concretely, the more one contributes to a better understanding of these problems, the more symbolic capital (e.g., prestige) one accumulates. In contrast, in the competition mode (reviewed below), symbolic (and non-symbolic) capital is assigned according to goals that do not necessarily promote the field's intrinsic interest. That is, not all forms of "struggle" are equivalent.

[5] The true outsiders are joined by complying insiders, who gradually forsake their intellectual interest in the field, which eventually makes them effective outsiders. Thus, the term "outsiders" may apply to them too; that is, these complying insiders also promote competitions and are subject to their logic (of focus on things that are easy to compare).

and are not concerned with how these measures are related to real understanding of the field (which they definitely lack). Clearly, in such an atmosphere, intellectual values decline. The health and vitality of the field require opposing these outside pressures, but this is far from being easy.

To summarize, competition develops when a field succeeds in generating enough interest so as to attract much external attention (i.e., attention from outside the field) as well as a large number of new participants. Thus, competition cannot be avoided in a successful field (regardless of whether or not it would have been good to avoid competition). Yet, competition can be tamed and/or moderated by the field's adherence to its intrinsic values and norms. The decline of intellectual values in a scientific field is thus a consequence of the scientific success of this field and its social failure to oppose the social forces unleashed by this scientific success.

4.2 The effect of society at large

This theory is rooted in the realization that what happens inside scientific disciplines is not independent from what is happening in society at large. Scientists are members of society at large, and they internalize its culture, which in turn affects their thinking and behavior. This effect is not restricted to their private life, it applies just as well to their research: People's most basic ways of thinking and communicating are a social product (or construct), ditto their behavior. Of course, people develop beyond the basics, and their development may be influenced by individual circumstances and/or traits, but one should never underestimate the fundamental role of the basics.

The fundamental impact of society on the scientists' ways of thinking and behaving means that these may change when society changes (especially, when it changes in a fundamental manner). Thus, if intellectual values decline in society at large, then they are likely to decline also in all scientific disciplines. Hence, the thesis that intellectual values have declined throughout the 20th century (and more so towards its end) is relevant.

The thesis that the Western society is shifting from intellectual values to instrumental ones can be traced to the end of the 19th century (if not much earlier).[6] Furthermore, it is often argued that this shift has intensified in the last couple of decades.[7] Indeed, in such an atmosphere, intellectual values decline also within the various scientific fields. It seems that the only counter measure that may be applied, assuming it is infeasible to offset the decline of intellectual values at the present society at large, is to transform the scientific fields into counter-cultures (i.e., subcultures that reject elements of the dominant culture (of the society at large) and/or promote values and norms that are not promoted by the dominant culture).

[6] It should be stressed that nobody objects instrumental values per se; the concern refers to their dominance (or their monopoly) in current Western society. For example, Weber who viewed instrumental rationality as the core of modern society (and its many benefits), was greatly concerned of the decline of intellectual values. This decline became a key concern of many thinkers in the 20th century; one notable example is Habermas (and, in general, the entire "Frankfurt school"). It should be noted that many social thinkers (but not all!) view Science itself as being totally instrumental, and thus view the rise of Science as a demonstration of the reign of instrumentalism. In my opinion, this is due to their looking at Science from outside and not seeing its intellectual face, which indeed is not the face that is typically shown in public.

[7] This can be demonstrated by recalling a famous example from the end of the 19th century. At that time it was noted that, while members of traditional societies have a fairly good understanding of the tools that they use, members of Modern societies use tools (e.g., the tram) without any understanding of their operations. They only have clear expectations as to what will be the result of applying these tools (e.g., they expect the tram to take them to the designated location according to a posted time schedule). In contrast, it seems that at the current age we use tools without even having a sound expectation as to the result of applying them; we rather try them out. E.g., consider the use of search engines. In general, current social trends advocate not trying to understand reality, which is viewed as a game, but rather focusing on playing this game.