

New Research in Science but not Only Conceptual Research on Knowledge Structures Blocking and their Causes

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Abstract

The need and urgency for a rupture (Kuhn) in today's science is now widely recognized. But how? Possibly (desirably) multiple solutions and alternatives will be found, allowing convergences or the healthy competition of ideas. We present a position that we defend as a contribution to the debate and confrontation of ideas, strategies, and operational modes.

A Dynamic Vision of Where we are

The starting point-today without forgetting that yesterday was 'today', that tomorrow will be 'today' and that in a week it will be 'today' again in seven days. Epistemology tells and explains that Science is not the search for the truth (and it never was, despite some blunders). But then what is Science?

- For Karl Popper it is the possibility to refute the conjecture, showing what is false, given the inability to demonstrate something significant. But still clinging to a fact is a fact.
- What Thomas Kuhn opposes (adds, complementing) that; however, the interpretation of the fact depends on the frame of reference in which this interpretation is made. Reference frames that do not evolve sequentially, but are subject to (scientific) revolutions, ruptures that seek to respond to crises resulting from the lack of efficiency of the existing solutions.
- To which Ian Hacking adds "the importance of the available instruments (conceptual or material)".

In a set of positions that Albert Einstein had already synthesized, although referring, fundamentally, to the restricted scope of physics, calling attention to the need to consider the triple relation phenomenon/signal /observer.

The centralizing monoliths (Aristotle, Plato, for example, not because of the authors, but because of the readers/followers), "remained" by the "Middle Ages" (although their influences are still felt today), more for the weight of the powers that supported them (or depended on them, negotiating powers?) than the problems they solved, "making forget", for example, Zeno of Eleia, the "Arab sciences", for instance Al-Zahrawi and his contributions to the origin of medicine, the Indian mathematics, the operative knowledge of China, and a multitude of other ways of organizing knowledge and its uses, with different implantation capacities and to provide operational capacities. [Note - Power has always been a very strong motivation].

From all this, we can deduce that science is a coherent set of knowledge, which has gone through many forms of structuring and classification, constituting a useful tool (a mean, therefore) for the most diverse applications (from supporting the execution of works and functions to the conquest of power), because it allows us to understand and explain, and sometimes even contextualize, the world in which we live, its phenomena and processes, as well as the problems we face.

We draw attention to some aspects (examples that we consider important) to consider when building this coherent set of knowledge:

A. Logic offers us, for example, a functional organization to deal with knowledge through the aggregation of a set of premises (possibly adapted to the purpose for which they are intended) from which we withdraw a conclusion, a syllogism, an inference. We observe and explore the parts of a whole that we consider difficult, even impossible, to encompass in their entirety, trying to select what we consider most important at the time. With, of course, the possibility of making mistakes in the choices we make and in the way we use them, which naturally leads to an advisable permanent doubt.

B. These choices lead to defining the points from which we start (axioms, postulates, etc.), which allows us not to be forever in the debate of the assumptions and... to leave. But we must not forget that the starting point (among many other things) determines the path we can follow and where we will arrive. All choices made that it will be good not to ignore, for, at least, if we make a mistake not to make the same or similar mistakes again. Even from mistakes we can learn if we organize ourselves.

C. In this way, information banks, memories (individual or collective) are created, with the most varied supports (paper, film, computer, magnetic records, etc., each of them with their specificities and therefore advantages and disadvantages), which enhance the neurological memories that we all have and use in the most varied degrees (although there are those who love the "smell of paper", sic, and think "the world will end" without it).

D. Conceptual buildings (buildings = construction, works, which some confuse with houses) are thus constructed, that serve as foundations for the action of man (see above 1), 2), 3), for example). As is normally the case with foundations, these often go unnoticed, but they define what the structures can be (they are structuring, literally), which they will support and the resulting organizations and dynamics. Consistency between foundations, structures, objectives, costs, etc., is essential for efficient responses. [Examples-in a house, foundations are usually solid cement (which can therefore sink if an earthquake liquefies the soil). In a ship, in addition to the solid structure of the keel and its branches, it is necessary to manage the existing dynamics through the placement of the metacenter. In a plane it is the "aerofoil" of the wings that in contact with the air, given the relative speed, that generate the supporting forces that are the supporting foundation. Different problems, with solutions following similar routes although adapted to the situations. So, we have to conclude that specificities are important]

E. The previous point alerts us that we cannot ignore that what we intend to understand and explain with science as a tool takes place in multiple and different spheres (with specificities), such as the different scopes to consider, with different contextual characteristics, such as research, development and technology

(RD&T), and also marketing (ranging from product definition to captivating a target audience - not to be confused with mere advertising). So, R, D, T & M, different situations and problems for which it is necessary to find adjusted and adapted responses to obtain the possible and desirable efficiencies. Without, of course, forgetting that in its evolutionary process and whatever the product is (scientific theory, equipment, procedure, publication, etc.), there are different phases with a sequence that passes, roughly, by identifying the problem, conception of a response, proto response (prototype), experimental response (pre-series), normalized response (series production) and readjustments in the process sequence, which requires, of course, "foundations", structures, dynamics, etc., adapted, in the name of the already spoken efficiency. And that, either in the areas mentioned above, or in the evolution of the product, it is always necessary to undergo experiments and readjustments, either in the design or in the manufacture of what we intend. Sometimes it is enough that one of these aspects fails to make the entire evolutionary chain unfeasible, however good the other components may be. Ignorance or treating problems superficially are errors often ignored with a simple (but serious) cause - incompetence. Some call luck to the ability to deal with fundamental details. Others consider it unlucky what happens when the necessary measures are not taken. Science, unfortunately, is not exempt from these flaws and many mistakes are made in the processes in the institutions, in the methodologies, in the decisions taken, etc.

F. Making compromises, eventually and with a strategic vision (not by system, or by a lack of determination that resembles a premature withdrawal), may be necessary, without however losing the overall vision and the notion that there was a tactical adjustment that should end as soon as possible. In science it was often necessary to make these concessions. For example, when it was necessary to "kill the phenomenon" so that it could be observed under the microscope (between "the lamina and the lamella", life cannot resist), or for the creation of collections that would allow the systematization of life of animals or plants to be studied, it was necessary to kill them in order to pin them in displays that constituted observation memories. The tools available, as Hacking said, also impose their position and will. The mistake is often in forgetting that a tactical adjustment was made for reasons that may one day cease to exist, and that we continue to accept its limitations.

G. Everything is in motion, everything changes, everything is transformed. Fortunately, we are unable to stop Earth or the Universe. Or even the tiny atom. Without causing a cataclysm in the corresponding dimensions and proportions. But moving and stopping are concepts that require a reference. And when we increase the accuracy of the distance to the frame, we find that not even the frame is reliable because not only does it move but it is also unstable (vibrates, oscillates, etc.). Moving and stopping are concepts... "vague", let us call them that, so that we don't have to add "like everything else", as we can infer from Einstein's above-mentioned position, from where we should consider that the

phenomenon, the used sign or the observer are nothing more than concepts (therefore, notions, conceptions, ideas, images, which removes the value of absolute, even dogmatic, that some intend to assign them). The knowledge we have today encompasses nothing more than the superficiality of phenomena and even more of processes (sequences of phenomena, which is illustrated, for example, with the passage of the photographic “snapshot” for the film that is nothing more than image sequences and never a continuum of those, which at an appropriate speed we later interpret as a continuity). So, humility is necessary.

A Dynamic Vision of where we want to go

The orientation that we will seek to follow. The course, the heading are just tendencies to survey, the path followed also depends on the incidents found. But it is the path that moves us, and it was to follow it that we left for the trip Where we go is a consequence of the starting point and the path followed. Arriving is the end, then it's over. The options and choices we had got in the way and, eventually, at the starting point we got. But it is the vision of desire, perhaps of the dream, that made us walk. It is not, therefore, innocuous to construct the “where to”? It can even be decisive, especially in moments of indecision and for the construction of the strategy. The objectives, even if they are not attainable or not achieved, give coherence to the whole and impose reasons that we might otherwise have considered negligible.

We will, therefore, define some of these objectives, almost all of which are attainable at reasonable costs, as we leave the pleasure of the dream to the imagination of each one and to the size of their desires.

Objectives

- a. Accept that scientific research is carried out at different scales and dimensions, all of them of equal prestige and importance. Not only, nor above all, due to the development of the area of knowledge in which these scales and dimensions are integrated, but because of the complementarities they offer, and the coherence they give to the whole (see, for example, point 5) above).
- b. Make methodologies more open, so that they can be (even) more rigorous and precise, by the dialectics they admit (closed systems are an unrealizable mental construction that often involves “killing the phenomenon” (see, for example, point 6) above), and because of the possibility that they open up to interdisciplinary or even transdisciplinary work. We have in mind not only the development of an investigation, but also all the phases of its construction, from the conception to search of a sponsorship, from the laboratory to the publication and dissemination (see, for example, points 4), 5) and 7) above).
- c. Promote the debate based not on “opinions” (of one’s own or of references to the power of institutionalized knowledge ... or persons), but on rebutting the premises and ways of reaching syllogisms, or if necessary, in the proposed axioms

and postulates, reasoning strategies and validity in the operationalization they offer.

- d. Leaving power relations (or instituted powers) for a serious and hard refutation, which uses the laboratory (broad sense) for refutation, replacing liturgies (which are sometimes useful “in man’s animal behavior”, if though managed), often unreasonable or out of date.
- e. Valuing the “laboratory” and the databases it generates not for the inherent costs (the past in the process), but for the value that we can derive from there (the prospects for the future). Let us not forget “the man who had his laboratory under his hat”, Einstein, of course, and what was achieved from there.

A Dynamic Vision of the ways where we can go

The situations that will be permanently negotiated. If we want to define everything that we are going to do at any given moment, we do not leave and therefore don’t arrive. The game (synonymous with fun, joking) is to negotiate the dialectics, not to wait for a hypothetical arrival. The possible paths we can take are endless. However, if we do reject less favorable aspects (directly or due to the side effects they have), we find that the amplitude we have will not be that wide. If, however, we conclude that this breadth is too narrow, the option we have is to dispense with some of the demands we have and the impositions we make, until we can achieve a possible balance, but without timorous miserabilisms or excessive greed (for the means we have or we can manage to get). We leave some suggestions of processes and tactics for the operationalization of the choice of paths and dialectics to negotiate, of the game to be hunted meaning:

- 1) To consider research as an investment that, therefore, must take risks, within acceptable hazard levels in relation to the expected returns, as is done in the financial markets where the predictable risk/gain ratio and the type of investor are considered;
- 2) To combat the presumption (since it is just an instrument of vanity, individual or collective) of research to “make a career” or “make trials/exams” meaningless giving them little value. Let’s do the promotion of a research “quest and exploration”. Let’s develop the creation of coherent reliable “theoretical buildings” (replacing those that are not). What means not to confuse knowledge with ‘erudition’ (extensive and “academic knowledge”, in the pejorative sense of the term, there will be others, or the basic loading of books) and easy speech;
- 3) To clarify and give more value to the operating modes, creating networks for debate and proposals in the different phases of model, prototype, pre-series with connection to the industry, not only at the level of what is classically called an industry originating from the “industrial revolution” (the activities that manipulate and transform the raw material for the production of consumer goods), but in all types of production and products, raw materials (theoretical, conceptual, materials, etc.) and consumer goods and added value;

4) To avoid the separation between ordinary citizen/scientist, as science is a tool to be used by as many people as possible, not only for the reasons of efficiency so often cited and that we maintain, but because it is no longer justified that there is an elite science and a majority (or a large part) that is no more (and it will be so little) than producers or consumers, parts of an economy/assembly chain, well-illustrated by Orson Welles in "1984".

Closing Up

The change is necessary because the crisis, in the sense that Thomas Kuhn attributes to it, is installed and demands it. We seek to contribute to the debate that we defend. With the enormous human capital existing today in science and research, as well as with the means and resources that until recently it would be difficult to

imagine, it is necessary to find efficient solutions and challenging questions. Although abundance is hardly synonymous of good management and efficiency, positive results are necessary so that the gap between "ordinary knowledge" and the proposals of science do not widen in such a way that communication becomes difficult or even impossible. It is not only financing that is at stake, but also, and above all, the ability to use some gadgets provided by scientific knowledge (technologies or others) as the predominant result. Thus, the possibility of exploring the capabilities and potential of the new means and proposals that science offers will hardly be able to go further than the mere scratch of the surface, since science is becoming more complex and its interpretation less "instinctive"/natural. Also, the abundance of centers of interest/attraction means that more and more people do not have the necessary time to find the pleasure of deepening matters.

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