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Comment

Six critical remarks on science and the construction of the knowledge society

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This article will briefly present a few theses and reflections of mine on some perversions and disruptions under way in knowledge development and in science representation. Nevertheless, I will abstain from exposing thoroughly the obvious and triumphal side of the coin. Namely, I am not going to extol the amazing fortune of science and knowledge, which have become the fundamental resource for development, at economic level in first place. Indeed, having reached a certain age, I can allow myself – although to a certain degree of oversimplification – less enthusiasm and a few old-fashioned ideas.

The first point I will tackle could be entitled 'Society of knowledge, that is: knowledge as a Capital'. Why? Society of knowledge means neither widespread education to reach any society layer in any country, nor information technologies available everywhere intended to distribute extensively information previously possessed only by small circles of people; nor does it mean new communities and cultures centred on this assumption. It means first and foremost – and as a driving force to everything – "cognitive capital". In short, knowledge as a capital. Since some decades ago, in fact, those people guiding and determining economic development have realised that an actively productive factor is *the knowledge* an enterprise possesses. On the one hand, the knowledge – often implicit yet decisive – stored in the mastery and expertise of its employees and produced by the accumulation of experiences and practices. And in this regard, enterprises have to face the crucial issue of its management: how can they discover this knowledge, make it explicit, enhance and capitalise it, make it circulate, build it, take possession of it and have it at their disposal? On the other hand, the knowledge necessary to produce or to process *innovation*, the one achieving new technologies or techniques, which is the result of research.

All of these factors make up a decisive competitive advantage. But the fact that knowledge has become an actively productive factor and is now acknowledged and looked for as a capital ('intangible', yet more important than the 'tangible' capital, a traditional feature in the industrial age) means also – or simply? – that there is *an appropriation and a capitalist exploitation of knowledge*. (Apparently, in Italy the word 'capital' is regarded as a left-wing term, yet – in average countries – these concepts may be easily found on the *Financial Times*).

Besides, the current process exerts a perversion on the human cognitive activity: it may be summed up as 'knowledge turned from purpose into means'. To the human species, knowledge is also a purpose in itself, an activity, a motivating and gratifying result. We acquire knowledge out of curiosity, interest, passion, and not only as an instrument to tackle an immediate problem or a practical action. At functional level, we accumulate this resource in sight of future possible uses, but we also exercise and amplify our cognitive capabilities. It is precisely as sex: its function regards the couple and their offspring, but that is not the reason we are doing it (*"Science is like sex: sometimes something useful comes out, but that is not the reason we are doing it"* - R. Feynman).

In psychological terms, it means that an "intrinsic reason" does exist (the pleasure in doing it or in being able to do it, or other internal 'rewards'). Nobody really needs external incentives of a social or economic kind (for example an approval or a role to play) or a practical return. Instead, when investigating this intrinsic reason, what interests the most is that it shows a downturn or even a drop when there is an instrumental advantage, a systematic external incentive.

A counterproductive strategy has been adopted: humiliating the intrinsic motivation to knowledge only for an illusory market reason.

Are we in the process of demotivating research, studies, knowledge, culture with this ideological and practical subordination to utility, production and career?

In a certain sense, saying that we are in the "society of knowledge" may be considered as a mere allegation, for all that has been said so far: knowledge in itself is "intrinsically motivated", it has a founding motivation, it is a non-instrumental good. A real "society of knowledge" would be a society *guided* (also) by this value. But this is exactly what is not happening: the proposed vision – and the real practice – is one of an instrumental and subordinated activity, a good that has to demonstrate and justify its utility. However, today even virtues have to demonstrate they are "useful".

A cultural stereotype with a clear American derivation, and a pragmatistic-economic nature, has now established itself not only in children's culture, or in the common sense, but also in the official science communication: museums, TV, science popularisation magazines (like the Italian '*Focus'*, for example). Science as technology, a scientist as an 'inventor'. Substantially, the purpose of science seems to be making 'inventions', i.e. producing new technology. The prototype of a scientist is not an abstract thinker or a Galileo ("the inventor of the telescope", *sic*!), rather a sort of Benjamin Franklin. In Disney comics, scientists are represented by Gyro Gearloose, who does nothing but inventing machines (luckily, crazy ones). Yet, in more general terms, one wants to know what patents have resulted from a specific scientific research, or what applications, new drugs, therapies, methods it aims at.

"What are these subjects, this knowledge for?" always ask my students, even when they are interested in and excited by what they have understood. Is it not a serious mistake – from the left and from the right – having instilled in an entire generation the message that one studies only to find their place in the market, only to find a job and to acquire new instruments for their job? Isn't this a message for subordinate classes? Yet bound to build a new class of subordinate people, those possessing a knowledge capital, not the old illiterate proletarians. Knowledge was not conceived like this when it was for the ruling classes! A message all the more stupid; because working today requires life-long training, and a large part of it is to be made through direct experience; because a real advantage in any job is given precisely by the general intellectual instruments, the acquired capacity of acquiring knowledge, to take possession of it, to use and criticise it, especially when knowledge development is the real capital; and finally, because the intrinsic motivation ability rewards you in your job.

Let's take mathematics as an example: is it still perceived as a "science"? Seemingly, it does not produce technologies; seemingly, it does not invent anything. Is mathematics maybe found – with its great "breakthroughs" – in science museums? Why should a student choose mathematics at college? If they have an aptitude for this subject, then they'd better opt for engineering, economics, or physics at least. "They are more concrete, you can realise what they are for; and you'll soon find a job." Basically, degrees should provide more professional training.

The fourth point I would like to touch upon concerns science's subordination to production. The reason why psychological or social science (except for sub-sciences linked to neurosciences) cannot be easily communicated as "sciences", is not only the intrinsic weakness these discipline have, or their being "human", so they fall into the chasm separating the hard, true sciences of nature from humanae litterae[1]. But it is also this ruinous vision of science as technology and, originally, the subordination of knowledge and research to production, to the economic profit. An incommensurable investment in all the scientific sectors that may provide an input to material production is under way and will increase in the next future. The biological, medical, chemical, environmental, engineering research fields are now completely subordinate, in terms of funds, regulating bodies, visibility, freedom. At the same time, there will probably be a relative (and possibly absolute) drop in behavioural and social research. And yet behavioural and interactional problems, cognitive and emotional disorders, hostility and conflict, deviance and ethical issues will be ever more explosive. But nobody thinks that they should be studied and understood; that these studies may be essential for policy-making, education and laws. This is an affair for politics and politicians, generic intellectuals, the general public or its lobbies. Knowledge has no use for politics, it only needs consensus or hangers-on. "Or perhaps, are you scientists able to give us a drug, an electronic contraption to prevent crime, or to make people accept our rules and values, or not to feel prejudice against immigrants?"

And yet, much more information spreading, much more official education, much more divulgation actually matches with an intact (rather, not naïve anymore, but corrupted) ignorance made of irrationality, of prejudices, superstition, lack of understanding, instrumentality. *The serious lack of a rational attitude reflected in the issues of life, of society, etc*. It does not seem a society of knowledge at all, but rather one of technics and of information.

It is not the technical knowledge what counts, nor the use or the possession of technologies, nor scientific 'notions'. They can coexist along with the worst and most stupid superstitions, totally irrational and senseless attitudes, not based on any analysis and understanding of the issue.

It is not the circulation of magazines like *Focus* or the spread of computer machines that will foster a more lay, open, critical mentality. Education and science communication are completely another issue. Communicating science, basically, is not communicating information or technologies. It is spreading education on questioning commonplaces, understanding what evidence they are founded on, criticising sources and 'data', looking for 'truth', not for predominance. It is not notions or information what counts, but knowledge, understanding.

Indeed – as Andrea Cerroni suggests in his excellent book, *Scienza e società della conoscenza*, Utet, Torino 2007 – knowledge is not simple information.

Knowledge is information structured in representations, integrated, relevant, aimed at *interpreting* data (through schemes and models), *explaining, foreseeing*, usable in effective action or in thinking.

However, this has some consequences on how communication on knowledge in proper terms is or should be implemented (disseminated/built). As Pietro Greco recalled reviewing the book by Cerroni "the communication of knowledge cannot be seen as a mere transmission of information".

In order to transfer/build knowledge, information must be processed, integrated, understood. Even though the media bombard us with information (often irrelevant or misleading), there is not a better understanding of the surroundings or a better social and democratic awareness.

Communicating knowledge also implies providing interpretative 'categories', instruments for mental work, schemes for thought and to interpret reality.

Knowledge should be considered as a necessarily public good: this is my sixth and last point, which is also my conclusion.

This is because public investment and public priorities are fundamental in scientific research, as is the 'public' character of the knowledge produced. The more the capital invests in knowledge production and subjugates it to meanly economic purposes and to the private appropriation of the social (cognitive) production, the more only the public – and not the market of goods or corporations – can guarantee freedom in the market of ideas.

Good part of this research should be *curiosity-driven*, aimed at finding questions and at overcoming them with other questions. A possibly and brilliantly "pointless" research, a good reason in itself for those who carry it out and those who have a real "passion" for it.

And please, don't tell politicians or investors that breakthrough innovations and the most profitable applications will stem precisely from there. Neither politicians nor businessmen have a vision for the future in their mind, if not within a couple of years or a few months; very much like intensive care patients.

Translated by Massimo Caregnato

Notes and references

[1] When psychology is communicated, if ever, it is with yoga or alternative medicine or graphology; or as techniques and recipes to sell, to seduce, to compete, to overcome disorders and complexes.

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