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# THE USE OF FICTION FOR PRESENTING SCIENCE TO THE PUBLIC

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## Abstract

In recent years new trends in presenting science to the public have emerged. Scientific novels (*The State of Fear* by Michael Crichton), science fiction movies (*The day after tomorrow*), drama based on science (*Copenhagen* by Michael Frayn) have been great international successes. The extent to and the modalities through which science is integrated within fictional narratives may vary from one piece to the other.

The ways science has been, and still is, usually unsuccessfully presented to the public is largely inspired by a top/down approach of knowledge transmission (deficit model). Such an approach put the emphasis on factual results which are supposed to provide the lay audience with a new representation of the real world. The consequence of this approach is the spreading of a “scientistic ideology” which prevents people to be reflexive about such representations of the world. As a matter of fact, the authority of science makes impossible the questioning of the relation between the world and what science tells them about it.

The use of fiction which only pretends to entertain us by appealing to our imagination and our ability to dream for presenting science to the public allows us to integrate more concretely the human dimension of scientific activity. It permits us to put an emphasis not so much on the results of science than on its procedures. It aims at picturing “science in the making” rather than “ready made science”.

The important point here is to go from an ideology which conveys tacit representations and values, which are difficult to change, to what could now genuinely be named “culture”, which gives back to people the capacity to formulate their own questions about science. This is the necessary condition to the establishment of a truly democratic dialogue about science.

**Keywords :** Fiction, Traditional popularization, Scenarios, Controversies

If, as the journalist Gerald Jonas has said in *The New York Times*, “fiction can be defined as a coherent tissue of lies”, one could wonder how fiction could possibly be used to present science to the general public ?! Is not science first of all the discovery of the truth and its popularisation the telling of such truths to the general public? How could this truth-content of science be made compatible with fiction as a “coherent tissue of lies”? or, as Jon Turney has asked : “How much can one understand about the world by studying words on a page ? “ [1] Actually, this latter question is not exactly the same as the one we’ve just asked. Turney’s question is about reality whereas our question is about truth. And contrary to what most

people would want to believe, truth and reality are not one and the same “thing”. Truth cannot but be the characterization of a statement in words. Reality is what these very words or other means may give us an access to. Reality cannot be true by itself. It is only what we might say, explicitly or implicitly, about it that could be considered either true or false.

Now, popular presentations of science to the public have to rely on the interest of such a public. And the question we must ask is therefore : what is this interest of the public concerned with preferentially, truth or reality ? In its traditional form, popularisation of science seems to have taken for granted that the interest of the public was turned towards the world itself considered as the big container of concrete objects, realities. Indeed, during the second half of the 19<sup>th</sup> century popular presentations of science were referring to the utility and efficacy of the knowledge it produced, the progress it entailed for human beings thanks to an ever closer approximation of reality itself.

Scientific knowledge was objective, rational —which meant "culturally neutral"— and potentially universal. Such beliefs vindicated the idea that science should be transmitted to all and that this transmission would eventually lead to some kind of universal consensus about the world all humans were living in.

Under such ideological conditions, the didactic component of popularisation of science was inescapable. It fed the inspiration of the populariser as well as the attitude of the receiver who had to be ready for taking in as many fragments of scientific knowledge as possible. The fight against obscurantism and scientific illiteracy had to be conducted and would eventually lead to a rise in the socio-educational level of society at large. The rhetoric used to speak about popularisation of science was borrowed from the sciences of education. Popularisation of science was a kind of knowledge transmission even though, as the "increasing knowledge gap" hypothesis suggested, such a transmission was far from being successful. Instead, the Eurobarometer's surveys which were conducted at the end of last century were leading to a very pessimistic diagnosis about the level of scientific literacy in the general public.

One of the main features of this popularisation discourse was its particular emphasis on the reality it was meant to refer to. Since it was quite impossible to explain science in the making —with the methods, the technological infrastructure, the implicit references to the sociocultural structure of the scientific community— popularisation of science was focusing on ready made science, that is, the knowledge produced by normal science about reality without any reflexive awareness of the perspective implied by the existence of a paradigm. The reference to reality itself could be considered as a rhetorical device which allowed popularisers to dodge the human dimension of the origin of knowledge. This knowledge was presented as being defined by the real object it was the knowledge of rather than by the creative imagination of scientists embedded in the assumptions they were permanently producing in order to improve their knowledge of the world.

Science in the media was permeated with sensationalism attached to spectacular events such as premiere surgical operation (open-heart surgery, hand or face transplants, *in vitro* fertilization, etc.), explorations of the outer space (Apollo program, Ariane 5, discoveries of exoplanets, etc.), technological achievements (channel tunnel, high speed train, Concorde aeroplane, etc.). The popular presentation of these scientific and technological feats included the idea of a far away science, a science that existed beyond the frontier of the everyday world of everybody. Even though science conveyed the ideology of a progress for all in the future, it remained restricted to the happy few. Michel Callon gave an appropriate name for this science : it was “confined science”. The positive side of science (cure, solutions, remedies, etc.) was always put forward. Science was frequently equated with certainty, factual robustness, epistemological solidity. [2]

## From scientific scenarios to fictions

The public resonance of science in modern societies started to change with the “affairs”. The issue of the infected blood in France (HIV) was possibly one of the first of a series of problems requiring at the same time the scrutiny of various specialists as well as the attention of the public through the media. Among the biggest issues which were recently echoed by the media, we find : the sea level rise due to global warming, the genetically modified organisms (GMO), the increase of obesity on a large scale, the disposal of the nuclear waste, the impact of the environment on the decreasing of male fertility, the vaccination issue, etc. These “affairs” have several features in common :

1) They concern potentially everybody in the society. To that extent one could say that science was getting much closer to lay people. The distance which made people believe that science was a world on its own far away from everyday life could not hold any more.

2) The "science" involved in these affairs may include many factual uncertainties which means that they are controversial within the scientific community itself.

3) But as they may have direct and/or indirect consequences on the whole population, this controversial aspect is not restricted to the community of the specialists. The controversies they tend to trigger are open to numerous heterogenous interests within the public.

4) They mix up scientific elements with political, economic, cultural and financial issues. They exhibit a very high degree of complexity. While it used to be possible to make a clear-cut distinction between science and non-science, such a distinction got blurred and brought about a lot of confusion in the roles played by the experts with regards to political authorities, journalists, association defenders, enlightened citizens, lay people, etc.

5) They are the source of new and unexpected questions to be asked to and solved by science in conjunction with other professional groups which may have a say in these affairs.

6) The frequent use of computerized models in order to simulate the complexity of the situation led to the use of alternative scenarios in order to feed the discussion between the specialists themselves within the scientific communities.

Confronted with such affairs, the presentation of science to the public was pushed towards new forms of expository devices amongst which fiction has a special place. Various authors (Caro, Jurdant, Turney) had already pointed to the relevance of fiction for the communication of science to the general public. But this contextual change in the way scientific activities, institutions and results have an impact on society made the use of fiction in order to present science to the public much more suitable for enlightening the citizen on the stakes attached to science as a whole.

## Consequences of the change

The use of fiction in communicating science to the public has interesting consequences. The most important one would be the giving up of the didactic effect of such devices. No one reads scientific novels nor goes to scientific dramas such as *Copenhagen* by Michael Frayne or *Oxygen* by Carl Djerassi and Roald Hoffmann in order to learn bits and pieces of science. It is true that science fiction authors like Jules Verne for example were inclined to insert genuine scientific elements in their novels in order to transmit such knowledge to their young audiences but, as R. Lambourne says ironically, these fragments “stick out like sore thumbs” in the text. [3]

But nowadays, scientific fictions such as *Copenhagen* and *Oxygen* are not really designed for pedagogic purposes. The idea is more to engage scientists and non-scientists in discussions and debates about the role and the place of science in our societies. The use of fiction is the only way to give a faithful account of the complexities issuing from the socio-cultural and political implications of science today. The possibility, through fictional narratives, to expose various and often contradictory points of view on the same aspects of a problem, is something that authors like Michael Crichton in his last book, *State of Fear*, has used very convincingly, going as far as mentioning the genuine references on which some of the fictional characters of the novel rely in order to argue their vision of the problem of global warming today. [4] It is interesting to note that Crichton, through his plot centered on ecological terrorism, is forced to cast the parts and in doing so to commit himself to one side rather than the other. It is obvious that he defends the position of the skeptic with regards to the alarming data gathered by the ecologist movements. It is as if the very writing of the novel could induce his commitment and his responsibility with regard to the issues at stake.

As Juan Jose Saer illuminatingly argued : "One does not write fiction in order to escape, by immaturity or irresponsibility, the constraints required by the treatment of truth, but precisely in order to make clear the complexity of the situation (...). Fiction multiplies *ad infinitum* the possibilities of treatment. It does not turn its back to a supposedly objective reality : quite the contrary, it merges itself within its turmoils, distrusting this "naïve attitude" which consists in knowing at first hand what this reality is made of." [5]

Fiction is also very useful for going through disciplinary boundaries which are so difficult to cross in the real world of scientific institutions. In *Jurassic Park*, the main characters belong to different fields of research: mathematics and paleontology, then enable the authors to envisage the same events from various disciplinary perspectives.

Our arguments about the opposition between traditional popularization and the use of fiction to present genuine scientific issues to the public could be summarize in the following table.

<b>Traditional popularisation</b>	<b>Fiction</b>
Solutions	Questions
Results	Procedures
Certainty	Uncertainty
Simplicity	Complexity
Discipline oriented	Multidisciplinarity
Didacticism	Coherent narrative
Ideology	Culture
Reality	Truth
Invariability	Variability
Progress	Problems
Ready made science	Science in the making
Absence of the scientist	Presence of the scientist and the scientific institutions
Objectivity	Plurality of points of views / relativism
Realism	Constructionism

### **The pedagogical use of controversies in science communication curriculum**

All the effects of the use of fiction may be used, to make students who want to become scientific journalists or communicators in science centres and museums sensitive to the human and/or social dimension of knowledge production and to help them to cope with scientific controversies which, most of the time, entail a public dimension.

Indeed the teaching of History of science may help the students to be aware of the fact that the development of scientific knowledge, in the past, has also been marked by quarrels, disputes and controversies over various aspects of this knowledge. But the Historical textbooks tend to restrict their presentation of science to the winners of the game. They forget about the losers so that science appears as a straight road to success and truth. The students have to get a closer look to the socio-cultural and political context of scientific discoveries, to see another picture. Fiction narrative is an excellent way to see how really is the battlefield of science where interests, passions, hate, love, power relationships, etc., are determinant forces of defeats as well as victories.

Within the curriculum of the Scientific and Technological Communication degree delivered by the University Paris 7, one of the practical exercises offered to the students is to dramatize a scientific controversy. The point is not to reconstitute as faithfully as possible the actual events which triggered the controversy and which fed it till its eventual closure. The idea is rather to visit again, through fictitious narratives, the stakes of one of the controversies that have made up the history of the scientific communities. The underlying

purpose of the game is to use drama as a tool for exploring our scientific past with the help of a creative imagination.

The dramatization of a scientific controversy of the past is beneficial for the students at different levels.

Most of all it stimulates their imagination. As a matter of fact they have to invent fiction in order to integrate the scientific controversy within a context which will enlight various aspects of the dispute.

Before the production itself, several choices have to be done by the students. For example they will have to choose the time of the narrative: will they adopt the perspective of the contemporaries of the actors of the controversy or will they tell the story from a more recent point of view ? This choice will have a great impact on the distribution of the roles and the setting up of the various characters involved: actors of the debates or not, experimented scientist or naïve observers.

They will also have to choose the style of the writing: Several forms of language are possible: play in verses or text in prose. There are also different approaches of the story: they can insist on the adventurous side of the story or the love affair which could surround it, they can invent a detective fiction or gave a science fiction turn to the controversy.

Theses choices will allow the students to write their script and try to do their best to catch and keep the attention of their expected audience.

The choice of the end of the controversy provides also the opportunity to asserting a personal view in an academic field. The unsolved controversy can be solved by the student with humour sometimes as in the controversy on the Piltdown man affair. But the students can also choose to show what is the actual agreement on the subject by presenting the protagonists continuing the discussion after their own death and while in Paradise or to let the problem unsolved even when it had been declared closed by the scientists .

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