

Article

The biography of scientists as a means of communicating science: analogies concerning a hermeneutic or empirical problem

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Sometimes scientists live real dramas or undergo social and psychological conflicts which have a positive or negative influence on the development and recognition of their research, discoveries and inventions in society, including the way they are recorded in history. This being so, the question is: to what extent can science be communicated to the public at large by the use of scientists' biographies as a motivational strategy? The controversy arises from the fact that usual (classical) science has traditionally argued for the separation (or de-linking) of the research (the object) from the researcher (the subject). Thus, if the above-mentioned motivational strategy is used in scientific communication, it could break a dominant methodological trend and consequently lead to a questioning of the myth of axiological neutrality in science. The communication of science by means of scientists' biographies could be useful for reaching a specific public, more directed towards emotional aspects, thereby awakening its interest in science, even amid cultural differences and in environments where interest in science and its utility is lacking. It could also reveal human aspects of the everyday life of scientists, bringing them closer to the public at large, which would contribute to the dissemination of science and knowledge.

Yes, scientists' biographies can be meaningful

A biographical narrative approach

To state that a biography is interesting or not is a highly relative question, if we take into account the various factors that make up a biographical narrative.

In the first place, a biography is not the "life" itself of the person, but a written account of it. Thus, in novelized biographies, for example, the literary style, the narrative manner and structure of the text, the speed and the emphases on one aspect or another are the prerogatives of the author of the work, and do not always correspond strictly to the rate at which the events actually occurred.

On the other hand, official biographies, or even documentaries of lives, generally seek to portray faithfully in writing the facts which occurred in the lives described.

A biography is an account of a person's life. Formerly a literary genre, biography is nowadays more connected with History. Biography is at the same time a skill and an art: it must be faithful to the facts, but give the impression of a novel, uniting the author's exposition and the reader's interpretation. This genre has been cultivated since antiquity and through various processes. There have been intimate biographies, psychological ones, autobiographies, memoirs, diaries, letters, etc. In this article I propose that scientists' biographies can be used as another tool for the communication of science in addition to those which already exist, without conflicting with them.

Peculiarity of scientific biography

What we have in the biographies of scientists is the story of personalities who stood out on account of their knowledge and dignity, but who also suffered incomprehension, opposition and anguish. They are

people who were applauded by the scientific communities yet who suffered adversities, very often political ones. In fact, public opinion and the media are rich sources for writing about the lives of scientists, in addition to the official documents.

New ideas and hypothetical samples

In the preface to his book "Fermat's Last Theorem", Simon Singh remarks how, in telling the story of Pierre de Fermat and his enigma, he described mathematical concepts and wrote the history of mathematics. He concludes by saying that, although Fermat's last theorem has been the most difficult mathematical problem in the world, he hopes to have managed to transmit an understanding and a perception.

Various examples of interesting biographies could be cited, in the realm of science. One of the most emblematic cases is that of Galileo Galilei, with the celebrated phrase "Eppur si muove", referring to the Earth's movements of rotation and circulation around the Sun. In fact, the Middle Ages are full of accounts of the persecution of all those who were interested in sceptical science, as also in philosophy. Let us recall Giordano Bruno, condemned to be burned at the stake.

One could highlight the role of women scientists such as Madame Curie, who came to be respected and taken seriously as a researcher in the face of prejudice against her sex, imposing herself by means of her intelligence and capacity. She serves as an example to be followed, as there are cases even today, especially in Third World countries, of women suffering from discrimination in the professional world of science.

Albert Einstein too, in more recent times, is a biography that exemplifies the conflicts faced, including political ones, and the inner dilemma of seeing his invention used for purposes harmful to mankind.

Vianna Moog, cited by José da Silva Martins, comments that, since Plutarch, biographies have constituted the great passion of eras in which a certain type of civilization is on the point of breaking down. "In such periods," he says, "one gets the impression that writers, sensing that the decline is fatal and perhaps irreversible, are no longer concerned with anything except making an inventory of the great names of a culture that is sinking fast. It is as if there is no time for anything else." Later on he remarks: "What a pleasure it is to dive into the past and see a life gradually emerge, within its own age, with its anxieties, its hopes, its triumphs, misfortunes and disappointments! For Machiavelli there would be nothing to compare with this."

Now what we are in reality discussing is that, as well as literary or documentary writing, biographical narrative can also be discussed in the light of some analogies, which function as "factors" and are characterized as presuppositions or trends of the different schools of historiography.

In the case of scientists' biographies, this question can become even more complex. It is quite true that many men who devoted their lives to knowledge, discoveries and inventions did not always become known in their lifetimes or even after they died, passing obscurely along the path of existence in the world of science and its mass media, despite all the efforts they may have made.

Others, despite being prominent in the world of knowledge and technology, lived dispassionately, without it being possible to detect any sufficiently "exciting" facts in their biographical notes to attract the attention of the public.

There is yet another class of scientific personalities, those temperamental minds whose unpredictable behaviour makes for passionate, electrifying biographies, despite the fact that the results of their research were not always of the same degree of significance.

The role of emotions and its various aspects – pointing out the differences between public communication and communication between scientists

The central point of this article concerns the emotional relation of the scientist with the knowledge produced by him, in biographical terms, and the discussion of the validity of using this resource as a strategy for the communication of science.

However, when focusing on emotional relations, we shall consider the various aspects of this, if possible as a whole, taking emotions into account not only with regard to scientists' lives, but also considering their consequent impact on the public. As for the challenge of communicating science to different types of public, and the role of rhetoric in this topic, I would like to point out that the emotions

are involved in various kinds of communication, even when the subject is science. Because it is a powerful tool for holding people's attention and establishing contents, emotion should be seriously considered for science communication, despite the traditional concern about the neutrality of science.

Nevertheless, we shall consider that the social environment in which scientists live encompasses several branches. Just like everybody else, they are involved in sectors of communication like family, work, friends, other social occasions and, what matters in this article, the public. Each sort of communication constitutes a whole process, and they probably influence one another to some extent. However, let also us point out briefly the communication between scientists and among various scientists, in which competition, rivalry, envy, admiration, collaboration, mutual support, friendships and every sort of social process can be observed, historically. Therefore, we shall consider that communication between scientists themselves and communication with the public are not the same, yet both suffer the influence of the social context as a whole. Besides, the public image of scientists does not necessarily correspond to their self-image, nor to that of their colleagues. The processes of scientists' public and private communication reveal a huge and varied spectrum of influences.

Such topics as emotion as a response, the comparison between imagination about science, appreciating fiction and understanding reality, reports versus perceptual models, the rationality of emotional responses, the evaluation of emotional responses, emotions and understanding, and connections between readers and writers, could be of interest for science communication, as well as the audience's impressions and feelings, for example surprise, hope, sadness, admiration, doubt, etc. In other words, I am saying that the audience will not necessarily understand the message as well as it is communicated, nor as well as is intended. There may be subjective factors of the individual perception of the audience, or of the group, which can interfere in the interpretation of science communication. These are emotional aspects to be considered and evaluated in the communication of science as a whole, in the audience's attitude as well as in the biographies of the scientists, when these are developed as a tool for the proposed goal.

One of the problems is that emotional aspects of a scientist portrayed in a biography can be very much a fiction made up by a writer. When the story is too fictional, it would be difficult to say that it is a good tool for communication. Besides, it is not always possible to draw a clear line between fiction and reality, depending on the manner and the style in which the biography was written. I admit that this is a serious problem, but I nevertheless maintain that it is worth running the risk of communicating science through the biographies of scientists, on condition that data are checked rigorously and that common sense prevails. These two measures would certainly minimize the risks of adopting an excessively fictional, and hence untruthful, biography. It is obvious that, where science is concerned, we must always try to aim at the truth, and not fiction. It is up to communicators of science to take this care, as the responsibility is theirs alone. However, this does not invalidate the methodology proposed in this paper.

The sort of obstacles to science communication that some people have reported encountering cannot be summed up merely as "a problem of truth", as a number of aspects of general communication are involved.

Although such a discussion could be helpful for the public understanding of science, science communication does not share exactly the same features in all fields of knowledge.

Of course, it might take a long time to collect ideas and samples, in order to have enough material available for the suggestion above, which requires debates, theoretical analysis enlightened by various authors, meetings, tasks, study plans, getting journalists and scientists together, and so forth.

The arguments of science sometimes seem to become unclear when transposed to the public, and expressions qualified as objective seem to lose part of their meaning. Because of that, we shall not transfer concepts directly from one branch to another. This would cause many distortions, ambiguities and unsustainable indeterminacies, in the context of which the audience's emotions and the specific characteristics of biography writing must be taken seriously into account. I am speaking about the difficulty of translating scientific language for ordinary people, plus the problem that biographies, as a general way, present emotional appeal. Thus, it is necessary to face the transposition of the objective language of science to another kind of language, in which certain amounts of subjectivism are unavoidable by its own nature. In a certain sense, it depends on the capacity to build connections and establish links. In other words, it depends on the ability to model communication. Although I do not deny the difficulties mentioned above, I nevertheless believe that the biographies of scientists can be exploited for the purpose of science communication.

Because of their emotional aspects, the biographies of scientists could be a tool to reach a certain kind of audience resistant to scientific knowledge but receptive to humanistic aspects. It might be also an interesting tool to communicate science amid cultural differences, in which barriers for communication sometimes go beyond mere written and spoken language.

For the same reasons, biographies can show human aspects of the “normal life” of scientists, breaking down or overcoming certain myths and bringing their image closer to the public. They would help to raise interest in science among ordinary people, for example, in developing countries.

The history of science is replete with the social dramas and psychological conflicts of scientists and philosophers regarding the object of their investigations. To exemplify this, it is enough to recall Socrates, Galileo, Giordano Bruno, Fermat, Einstein, amongst so many others. A recent example of an inspiring biography of a scientist can be found in the article entitled “*An insider’s view on science and society. Re-reading John Ziman*”, by Ana Maria Vara, on <http://jcom.sissa.it>, and which highlights the personality of John Ziman, who appears to have been endowed with personal charisma and magnetism.

What I am stressing, then, is the moving human question – which may involve the subject and object of the research, at a given historical moment or geographical location – as opposed to the idea of the transmission of science stripped of the human context in which it was conceived.

I do not deny that scientific knowledge can be transmitted in a more “neutral” way, free of any emotional content. In some cases, science can even be considered as a “hypostatic” category, in its ontic aspect (or hypostasis), whose existence is valid per se and is thus independent of the subject who conceived it, as we will see below.

Criticisms of the myths and the paradoxical quest for neutrality in science

The much-vaunted quest for knowledge which is free of values and valid for its own sake was the mainstay of the historical development of the scientific method, based firmly on proof, particularly from 18th century French rationalism onwards.

Everyone is aware of the hue and cry about the so-called “axiological neutrality of science”, as well as the myths which may be implicit in this question, exposed especially from the 1960’s onwards. Note that the question, despite its classical nature, is not exhausted. The relativity of the concepts of scientific truth, the proofs and methods, its use and validity, are questions as timeless as science itself and the possibilities of thinking about it.

Currently, although we are aware that we cannot speak of “nowhere” (in other words, scientific discourse, by the mere fact that it is discourse, cloaked in words and expressing itself through them, is not neutral), we also know that scientific activity consists of investigating, with the greatest rigor and best possible criteria, certain types of “truth” in relation to the object of the research, whether by means of pragmatics, correspondence, equivalence, etc.

In this topic there may be a methodological paradox for science, poised as it is on the vital, indispensable tension between neutrality and whatever myths may be implicit in the problem, which constitute two poles conditioning certain aspects of epistemological criticism. In other words, the paradox is that, despite searching for a neutral truth, science knows that this neutral truth is itself a myth. Nevertheless, searching for it is a guideline condition for more secure results of knowledge.

To this paradox I would like to add a complexifying element, albeit compatible with it by nature: the resource of biography as a strategy for the communication of science, which can be presented by means of the following analogy. Just like the paradox which exists between the scientific methods and the myths which permeate neutrality, so also are the biographies of various scientists replete with questions enlivened by human contingency, such as passion, taste, self-interest, rivalries, craving, obsession, hatred and love, which bind the object to the subject, the creation to its creator. Thus, as we pointed out in the previous section, the problem lies in the different kinds of language. Biographical narratives, in order to be attractive and more interesting, tend not to be mere records of cold facts, but rather humanistic life stories.

Another analogy can be drawn: just as science in general makes use of analysis – the separation of the whole into distinct parts as a study method – in the same way the re-assembling of the parts through the communication of science can provide new prisms for reflexion, such as the binomials reconstruction, organization/disorganization, etc.

The result of the re-assembling is inevitably different from the “whole”, understood as the initial state of the object prior to the analytical procedure. Therein may lie a new path for the communication of science: the reconstruction of the scientific context, by combining the scientist’s biography with the knowledge produced by him.

Conclusion: public understanding as a hermeneutical or empirical problem in scientific communication

The chief inference which can be drawn from the difference between Interpretation Theory and Hermeneutics is that the former is mainly tied to conceptual levels, while the latter develops the interpretations, applying to the reality to which they refer.

It does not therefore sound correct to say that hermeneutics is an obsolete, outdated chapter in the history of philosophy or methodology in general, as hermeneutics is present in everything that the mind interprets by concretizing, in its application and practices.

Besides this, the various lines of hermeneutics are being renewed by the recent findings in rhetoric, by advances in linguistics in general and pragmatics in particular, and by everything which is conventionally referred to as “communicative reason”, in the expression coined by Habermas.

Hermeneutics can clearly also be relevant in scientific communication, in which contextualized results are evaluated by their credibility as regards science, and their effectiveness with regard to communicative strategy.

The instruments for measuring quantities, just like the indicators which allow us to evaluate the quality of the result of the science communicated, are the public's understanding and, as a consequence, its behavior with regard to the content transmitted.

Another analogy is pertinent at this point: just as application distinguishes hermeneutics from mere interpretation, so also does change in the public's behavior distinguish the effective communication of science from the mere transmission of information.

However, bearing in mind the fact that scientific communication is of a multidisciplinary nature, consisting of a variety of elements, from the most concrete to the most diffuse, it cannot be denied that the range of distortions to which any hermeneutics would be susceptible is quite broad, from which it follows that, to a greater or lesser extent, we would be dealing with areas of vagueness, imprecision and uncertainty.

Could the biographies of scientists contribute to the effectiveness of the results of science communication?

By way of a reply to this question, we can map out two paths: one, that of hermeneutics, which interprets the object of science and the biography of the subject who produced it, first describing the strategy for the communication which is planned.

The second path is the empirical one, which communicates science through the medium of the scientist's biography, afterwards evaluating and remodeling the strategy, correcting or contextualizing it, as the case may be, in accordance with the reaction (understanding and behavior) on the part of the public.

Both these ways - or methods - can be equally valid as a communicative strategy, and neither rules out the hermeneutic possibilities of science and its problems, whether they precede or follow the experiment.

In either case, the emotive element remains present as a link connecting the communicators of science with the public, just like, by analogy, that between writers and readers in general: a passionate element, capable of motivating the most varied initiatives, breaking (fortunately) with any analogical formalisms that might become crystalized by the time of the mind.

In conclusion, despite the hermeneutical and empirical problems, the biographies of scientists can contribute to the effectiveness of the results of science communication because they are able to reach a certain kind of audience, focusing on emotional and humanistic aspects, and also because biographies could bring the image of scientists closer to the public, thereby helping to break down barriers and resistance to the usefulness of knowledge, even amid cultural differences.

Refereces

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