Opinion Page

Opinion Page: A new challenge in the environmental scenario: Will Science Education defeat Post-Truth?

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In 2016, the Oxford Dictionary chose 'post-truth' as the word of the year, 'denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief' (*Oxford Dictionary*, 2016). Four years later, we have already witnessed the boom of fake news all over the world and its undeniable impact in election outcomes as well as in the public opinion in a broader sense.

In Brazil, more specifically, we are currently observing an increasing number of people supporting the most unexpected causes, such as the defence of flat earth conception, the adherence to anti-vaccine movements, the denying of climate change, and more recently there were fake news denying far accepted hygiene methods used to prevent the dissemination of coronavirus (Brazilian Ministry of Health, 2020) and the quarantine recommendations. Furthermore, religious claims have been positioned in equality with scientific studies, and even public policies have adop-

ted practices without scientific support, lacking a more sensible debate that includes and respect the opinions of different sectors in our societies (SBF, 2018).

Besides, in Brazil, it is possible to feel an overall environment of contempt against Science and the scientific community, mainly motivated by statements of influential politicians in social medias such as Facebook, YouTube and Twitter. In this scenario, we also observe the sustaining of an intense polarity among society, which prevents any dialogue and construction of reasonable solutions. The understanding of this social scenario (and how to reverse it) should not be matter of interest only of sociologists but it ought to be considered as part of the problem (and of the solution) that scientific community will have to address to solve the big global issues such as pandemics and climate change.

Technical and technological improvements will be necessary to deal with contemporary global challenges, but the relation between science and society must enter this equation. Thus, we can say that the current scenario is quite different from that in which authors like Paul Feyerabend (1995) opposed the description of science as an institution of the highest authority. We are living a time when society has ceased to have total confidence in science and has gone to an absolute distrust in its methods and results. This change was recognised recently by Bruno Latour (Vrieze, 2017), considered one of the protagonists of the 'science wars'.

Two Questions

This environment being briefly described, our intention now is to propose two questions, aiming to offer preliminary answers for them. Firstly, we would like to discuss 'Where did we go wrong?', and secondly, 'What can the scientific community and science educators do now?'.

To answer the first question, we must acknowledge that there is not only one factor involved in such a wide-ranging situation. So, all we can offer is one possible way of understanding the present scenario. Our claim is that whether the public opinion has been hostile to the scientific community, it means that scientific community failed to show to the general public the role of science in contemporary society. Also, if alternative traditions and ways of knowing are being considered relevant enough to be contrasted with scientific communities in paramount discussions (such as the shape of earth, for instance) and still attracting people's attention, we can also assume that the scientific community has also failed explaining and convincing different people about their perspectives on these contemporary topics.

In both cases, the genesis of the problem relies in the miscommunication, or the lack of communication, between scientific community and society. We propose a historical explanation for that. The success of scientific endeavours, translated into the industrial revolution, made science one of the pillars of the western society in the 20th century. During the period of the World War II and the Cold War, it was not possible to dismiss science contributions, since the development of nuclear technology could represent victory or defeat. This geopolitical situation created a specific change in the pedagogic practices – which become more pragmatic and instrumentalist (Kaiser, 2005, 2006). In this period, there was no possibility of criticising science, reflecting on its meaning or relevance. Science, during this period, was considered to be essential in educa-

tion, contributing to encourage new scientists and engineers in a high scale.

In the nineties, the cold war ended, but its scientific pedagogy was still alive; and contemporary scientific education is still much based on memorisation and instrumentalist solution of problems. Scientist and science educators failed to realise that it was necessary to justify the importance of science again. The proposal of making science education and history and philosophy of science closer (Matthews, 1988) and discussing nature of science in science courses is still far from being part of the reality of most of our schools.

In Brazil, it is the scientific courses offered during high school that are the main source of knowledge about science for regular citizens. If during high school, someone does not learn about scientific knowledge, about how science works, about how it is related to social and political subjects one probably will not learn about it in any other place. And, unfortunately, many researches in Science Education have confirmed that this is the case.

Science in Society

Furthermore, the research that is produced in the universities often does not dialogue with the basic expectations of the society that pays for it. Of course, it is important to perform theoretical science and to research about contemporary international problems. However, it is not possible anymore to make science chiefly directed to an international agenda. Today, science needs again to answer society expectations and to make this answer socially visible.

In order to defeat the post-truth scenario, we believe that scientific community (more than ever) ought to be present in the heart of society. Or, in the other way around, it is necessary to take society to the heart of science. Public universities (where most of science is produced in Brazil) must never stop being the spring of the specialised knowledge, but it has also to become the safe zone of dialogue between specialists and non-specialists, even if that means to dialogue with flat-earth defenders.

By taking society into the heart of Universities (or by taking science into society), scientists can not only better communicate science, but also to listen to the different needs and expectation of different social groups, to which, for sure, they can try to manage newer solutions, built in a horizontal relation. However, if scientists keep sustaining the privileged epistemological status of science without listening and learning with other groups, science will not have a chance in the post-truth scenario.

Schools

Again, the ideal context where science can rebuild its place in society is in high school education. It is in the regular science education that the public opinion about science is formed. It is the right place at the right time to discuss how science answers to contemporary problems and how science works – making explicit not only the epistemic factors involved in science but also its political, economic and sociological entanglements (Nascimento, Lima, Cavalcanti, & Ostermann, 2019).

It is also the place for fomenting the spirit of inquiry and skeptical thinking. Nowadays, it is responsibility of science education also to teach how to search for trustable references and how to check their reliability. Scientific Education must become contemporary, must look at the local problems

and must address objective solutions created by the political scenario (Lima & Nascimento, 2019).

References

Feyerabend, P. (1995). *Against Method*. London: Verso.

Kaiser, D. (2005). *Drawing Theories Apart: The dispersion of Feynmann's diagrams in Postwar Physics*. Chicago: Chicago University Press.

Kaiser, D. (2006). Pedagogy and the practice of science. doi:10.1080/14697680601043290

Lima, N. W., & Nascimento, M. M. (2019). Nos Becos da Episteme: Caminhos confluentes para uma contra colonização didática em meio à crise da verdade. *Caderno Brasileiro de Ensino de Física* 2, 36(3), 589–598.

Matthews, M. R. (1988). A role for history and philosophy in science teaching. *Educational Philosophy and Theory*, 20(2), 67–81. doi:10.1111/j.1469-5812.1988.tb00145.x

Minestry, B. H. (2020). Saúde sem Fake News. Retrieved March 4, 2020.

Nascimento, M. M., Lima, N. W., Cavalcanti, C. J. de H., & Ostermann, F. (2019). Cultura política, desempenho escolar e a Educação em Ciências: um estudo empírico à luz de Pierre Bourdieu . *Ciência & Educação* (Bauru) , Vol. 25, pp. 431–447. scielo .

Oxford Dictionary. (2016). Oxford Dictionary 2016 word of the year. Retrieved September 22, 2018.

SBF. (2018). Um Basta à Pseudociência. Retrieved March 4, 2020.

Vrieze, J. (2017). Bruno Latour, a veteran of the 'science wars,' has a new mission. *Science*. doi:10.1126/science.aaq1805