Editorial

End of imagination and the misuse of knowledge: a dystopian scenario of Artificial Intelligence

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According to this Einstein's affirmation:

> "Imagination is more important than knowledge. For knowledge is limited to all we now know and understand, while imagination embraces the entire world, and all there ever will be to know and understand."

It is a warning about the relevance of creativity, the ability to ask questions and seek answers, where knowledge is necessary but insufficient.

Einstein himself left us an example of the role of scientists in leading the course of humanity beyond scientific work. Faced with the risk of an eventual Nazi victory in World War II, he was one of the signatories of the letter to the then US president, Franklin D. Roosevelt, suggesting a program for the development of the atomic bomb. As a pacifist aware of the risks of that technology, Einstein bowed before the greater risk of Hitler winning the war race. In 1942 Roosevelt started the Manhattan Project. What came after is well known.

Ten years after the end of the war, in 1955, based on a manifesto launched by Bertrand Russell and Albert Einstein, the Pugwash Conferences on Science and World Affairs was created, with Joseph Rotblat as its first president. A Polish Jew who fled Nazism and settled in the United Kingdom, physicist Rotblat was one of the scientists who participated in the Manhattan Project, in the Los Alamos desert, in the USA. However, in 1944, a year before the explosion in Hiroshima, he realized the Germans could not develop such an artefact, so he left the project. He was one of the few to have this attitude, becoming a reference in the responsibility of scientists regarding the uses of science they produce. In 1995 he was awarded, along with the Pugwash Conference, the Nobel Peace Prize for their efforts to diminish the part played by nuclear arms in international politics and, in the longer run, to eliminate such arms.

Another researcher who participated in the Manhattan Project was mathematician Jacob Bronowski. He was also a Polish Jew who fled Nazism and settled in the United Kingdom. Nevertheless, unlike Rotblat, he worked at Los Alamos until the project was completed. A few days after the explosion of the second artefact, he visited Nagasaki and was shocked by the scene of destruction he saw: "The god-man usurped God's role as master of nature, with the power to dominate and destroy." His scientific career took a turn, and he began to act as a disseminator of thought on the responsibility of scientists regarding the use of the science they produce: "We have no right to cause such a transformation in nature; ethics must regulate science"[1].

The examples of Einstein, Rotblat and Bronowski are relevant for a reflection on the current moment, which places us in front of (un)certainties about the consequences of the rapid advance of artificial intelligence - AI. It is no longer just about the prosaic application of such tools, as in

the recovery and retouching of photographs. AI is now capable of acting as a scientist simulator! Full texts, in the format of academic works, can already be generated from a few commands and keywords. In arts, it is possible to generate paintings with the style of renowned artists but not produced by the supposed authors.

Many questions arise when we reflect on the dystopic future of the indiscriminate generalization of AI use, which can have "natural stupidity" as a side effect.

- How to assign responsibility to a robot?

- How to encourage diversity and originality when more and more young people and children trust the ready-made answers of an application that reproduces what "the majority" (at the moment, white, English-speaking, and, obviously, from developed countries) disseminates on the Internet?

- How to manage authorship credits when freely accessible texts on the Internet are used in mosaics of new writings?

- How to detect plagiarism in the face of cunning algorithms assembling mosaics of ideas' expression?

- What are the rights of Picasso's heirs over a new painting attributed to him that he did not paint?

- What are the effects of artificial AI on employment?

- Where will the imagination remain after knowledge becomes a free territory for use (and abuse) without criteria, shame, and commitment to human values?

It is worth remembering this poem by Bertolt Brecht², referring to the Germans' complacency in observing Nazism advance:

> First of all, they came to take the gipsies
> and I was happy because they pilfered.
> Then they came to take the Jews and I said nothing,
> because they were unpleasant to me.
> Then they came to take homosexuals,
> and I was relieved, because they were annoying me.
> Then they came to take the Communists,
> and I said nothing because I was not a Communist.
> One day they came to take me,
> and there was nobody left to protest.

Furthermore, we shall ask ourselves: what happens after AI steals the jobs of those who develop AI? Even technology tycoon Elon Musk, who is not precisely known for his prudence (one of his futuristic cars exploded in the middle of the product's public presentation) nor for his sensitivity towards others (he massively fired employees via email when he bought Twitter), was concerned about the direction taken by the AI. In February of this year, the CEO of Tesla, SpaceX and Twitter warned guests at the World Government Summit in Dubai, United Arab Emirates: "AI is one of the greatest risks to the future of civilization". Musk is a co-founder of OpenAI, the company that created ChatGPT. Can these be crocodile tears, or is he a sorcerer's apprentice?

The atomic bomb and several other applications of scientific knowledge in technological arrangements remind us precisely of the image of the sorcerer's apprentice, who produces the spell but does not know how to undo it.

Other issues arise from this: the separation of scientific and technological activities, enhancing labour division and causing the loss of a whole-picture perception. For the atomic bomb, there are still doubts concerning the nuclear research for peaceful purposes, bomb production or the decision to launch the war device. The same goes for the scientist working on laser research for medicinal purposes and the appropriation of that scientific knowledge by the military sector and its later use in the North American Strategic Defense Initiative (SDI) program, also known as the Star Wars project, which aimed to create a network of satellites equipped with laser beam devices to destroy possible missiles from space.

It is possible that many scientists who worked on the development of AI dreamed of its benefits for humanity and did not even envision the current applications. Others, however, continue to think that the applications, despite current criticism, are essential and valid.

Here we highlight the warning from the precautionary principle (*vorsogeprinzip*) evoked by Hans Jonas[3]: better safe than sorry.

Other questions arise:

- Should prudence also apply to basic research or only to applied research?

- Are scientists responsible for the technological derivations of their research?

There is an illusion that by applying them to everyday products (contrary to war artefacts), neutrality and the well-being of humanity and the planet are ensured.

Just as Jonas asserts that humans, as part of nature, are not ethically allowed to cause environmental disruptures, it is time to extend his precautionary principle to other disruptive topics.

If we do not know how to undo or control the spell, we better not do it.

In its first issue of 2023, SiD publishes a *Dossier* on "Dismantling of the Brazilian Environmental Policy" with six articles and a *Varia* section with three other articles. In addition, a tribute note is published to Julie Thompson-Klein, who died recently and left us a strong legacy on transdisciplinarity.

In the *Dossier*, Neves begins by assessing the construction of Brazilian environmental policies and the recent abrupt changes under the Bolsonaro administration. Next, Bonelli *et al*. examine the effects of President Bolsonaro's administration on environmental analysts involved in conducting policies to prevent and control deforestation in the Brazilian Legal Amazon. Next, Moulin discusses the capacity and bureaucratic identity of the Brazilian Institute of Environment and Renewable Natural Resources – Ibama through a qualitative analysis of its civil service exams in recent years. Coudel *et al*., on the other hand, discuss the dismantling of the pesticide control policy, and Silva, through the Biofin methodology (Biodiversity Finance Plan), presents the political and institutional aspects that contributed or did not to the financing of biodiversity policies within the federal government. Finally, Canal and Verdum discuss the various difficulties in implementing environmental health actions in the perception of a multidisciplinary environmental health team in a municipality in southern Brazil.

In the *Varia* section, Cecato and Magri evaluate the potential use of treated sewage in the irrigation of seven crops produced in Santa Catarina, considering the current demand for irrigation water in the study area and the future production of treated sewage. Next, Oliveira *et al*. present a sustainability

index (SI) of rural properties using the SAFA tool in Santa Catarina. Finally, Berrutti *et al.*, in the context of the fruit and vegetable sector in Uruguay, discuss how "soft system methodologies" contribute to building a representation that considers different perspectives, focussing on the particularities and opportunities for technological innovation and collaborative management in the chain.

We hope you enjoy the reading!

NOTES

1| Bronowski, Jacob. **The common sense of science**. Cambridge, MA.: Harvard University Press. 1978

2| Inspired by a poem by Pastor Gustav Niemöller

3| Jonas, Hans. **The Imperative of Responsibility**: in search of ethics for the technological age. Chicago: University of Chicago Press. 1984.