



'Post-pandemic' directions of Research, Education, and History of Earth Sciences

Presentation

The remarkable reception of manuscripts by *Terraê Didática* in 2022 comprises more than 80 unpublished contributions. The numbers indicate that the national and international geoscientific community considers the magazine an agile and effective vehicle for disseminating research results. The editors are grateful for the generous cooperation of dozens of highly qualified specialists from Brazil and abroad, who lead a demanding peer-review system. The relevant educational role of an editorial job and young new authors is worth noting. The processing capacity of new contributions has increased, but the response does not always occur at the expected speed. The unique number of 39 papers rejected throughout the year is due to incomplete submission cases and low quality detected by the reviewers, who are responsible for rigorously applying the selection criteria. To improve the manuscripts, the editors tried to adopt some interaction mechanisms with the authors without great success; this is the reason for archiving so many communications. Thus, volume 18 published the lowest number of contributions since 2019.

Recurring precautions regarding the variants of the Covid-19 virus reveal that social distancing – along with other combat measures – should continue in the coming months while we await the resumption of vaccination campaigns. On the other hand, during the pandemic, it is undeniable that the entire national and international scientific community has benefited enormously from online activities, which have assumed a prominent role and should remain. Congresses, symposiums, and other scientific meetings were heavily affected by the Covid-19 pandemic, but face-to-face activities are gradually resumed. Hybrid scientific meetings, which connect face-to-face to remote participation, will be maintained and always encouraged, thanks to improved teleconferencing resources. Soon, face-to-face interaction will stimulate interpersonal and inter-institutional cooperation. Its products will feed back the mechanisms for generating new knowledge. The picture is favorable, especially in the case of Brazil, whose scientific community has suffered from uncertainties, restrictions, and very

serious impacts in recent years, despite the undeniable link between science and the development and well-being of society.

Results of purely academic investigations were published, alongside results of applied research, which together emphasize the need for managers and decision-makers to recognize the strategic condition of Earth Sciences for a populous country of continental dimensions, which depends on the proper management of complex issues. The pages of volume 18 illuminated the most different fields of knowledge related to Earth Sciences, such as soils, the use of games in teaching, Geotourism, Geoethics, waste management, ecosystem services, geoenvironmental perception, Paleontology, and History of Science. It would be unreasonable to demand that managers, administrators, and public authorities have deep knowledge about the working mechanisms of the Earth as a system and the uncontrollable action of natural forces. They should dominate, however, the rudiments of knowledge, that is, a repertoire of postures and ethical attitudes that are part of the field of Geoethics and that introduce limit-amplify human responsibility towards the Earth. Peppoloni (2022) summarizes the ethics of virtue and responsibility as a “wisdom capable of guiding choices, a wisdom of living on Earth, which presupposes an awareness of the position and human condition in the great natural architecture”. After emphasizing that “Gaia, our mother Earth, is a concept transversal to many human cultures”, the researcher recalls that, when dealing with Earth, there must be respect and care, as the ecological crisis is a crisis, at the same time, of the natural ecosystem and the human being, “because the latter is an integral part of the former”.

Denialist and hostile attitudes towards science are weakening, allowing new opportunities for transmitting specialized knowledge and scientific dissemination. There are many complex and emerging issues, ranging from climate change, mass extinctions (Kolbert, 2015), and natural disaster prevention to water, energy, raw materials, conservation of geosites, and dissemination of geoscientific knowledge in formal education.

Formal education continues to be a critical barrier to curbing the circulation of endless lies,

beliefs, absurd theses, and conspiracy theories, despite the incipient barriers raised against such criminal actions. Lies spread fear in the population and discredit science and scientists (Carneiro et al., 2022). We will continue to be threatened in 2023 by fake news, but the seriousness of the threats is even greater. The post-Covid reality showed a darker world, not only because of the abundance of fake news and unlimited access to it but because it revealed a widely disseminated degree of ignorance. The post-Covid world has revealed a universe of individualistic people, incapable of looking at their fellow man as someone very close to them who will never have access to the luxury and resources available to a certain privileged “caste”. Ignorance goes beyond ideas like “flat earth” and other barbarities but reflects critical educational problems. The absence, scarcity, and low quality of education and teaching entail profound restrictions on the progress of members of a highly unequal society such as Brazil. Inequality doesn’t bother them; knowledge has never been so badly distributed within modern society:

(...) we can decide to continue feeding the ongoing destructive process or use our extraordinary creativity to stop it. Our future lies in understanding and learning to manage this ambivalence, in the awareness of the unpredictability of human history (Peppoloni, 2022).

It is up to teachers – at all school levels, but especially in basic education – to play a fundamental role in developing permanent doubt, questioning, critical analysis, and logical-deductive thinking in their students. Only proficiency in science will be able to promote skills that allow abstractions in the most different fields of knowledge and eventually establish cause-and-effect relationships. Concern about the development of these competencies is absent in basic education, in the same way, that it occurs with the elementary notions of Geology. It is necessary to make a concerted effort to overcome the losses, especially in higher education courses, because it is there that the teaching skills required to bring about substantial changes in basic education itself will be shaped. The systemic view provided by modern Earth System Science should deserve emphasis, not only in Geology and Geography courses, as it happens at Unicamp, but also in Biosciences and engineering courses: there is no way to see the environment without taking into account the dynamism that is intrinsic to it.

Brazilian curriculum reforms gained momentum from 2016 onwards. The National Common Curricular Base (NCCB) of basic education ignored the existence of Earth Sciences as a component that educates citizens. Knowledge of the interactions of the planet’s spheres has become even more dispersed in the prescribed curricula for children, adolescents, and young people. It becomes a distant target for basic education graduates to form an integrated vision of how the Earth works. The big picture has several implications because it prevents the student from (a) using the knowledge to explain the distribution of earthquakes and volcanoes; (b) using knowledge to explain the distribution of different types of climate; (c) pursuing a temporal perspective on past changes; (d) understanding the main evolutionary changes of the organisms that populated the planet in the past; (e) understanding the causes of great mass extinctions of species; (f) applying knowledge to estimate the consequences of human actions on the environment and on geo-biodiversity; (g) taking advantage of knowledge to protect themselves and the community in which they live from natural and technological hazards; (g) recognizing the relevance of the concept of sustainable use of resources.

The implications of the NCCB in teacher education maximize the challenge and cause concern. Resolution no. 2 of the National Education Council (NEC) of 12/02/2019 restricts the initial teacher training curriculum to the matrices of competencies and skills prescribed for basic education (Bacci, 2022). Using Bloom’s taxonomy of educational objectives, Bacci (2022) reveals that the thematic unit Earth and Universe prescribes cognitive skills at a less complex level (remembering, recognizing, defining, etc.) rather than high-level skills (discussing, applying, evaluating, etc.). The NEC’s resolution subordinates what the licensee must learn to what the student must achieve. Without a shadow of a doubt, this vicious cycle severely limits citizenship training, as several authors have observed.

Ads and promotions

In 2023 the magazine will resume the campaign to obtain institutional support, thanks to the visibility provided by the advertisements in *Terrae Didatica*. We will be delighted to send and discuss values and exclusive benefits with each company willing to support our mission. We offer alternatives so that companies, public bodies and entities can

effectively reach the target audience to co-invert this comparative advantage into results.

Call for papers: 2023, volume 19

Terræ Didacticæ open to disseminating outstanding contributions of excellent quality in multidisciplinary research and educational application fields, always focusing on Geosciences. The journal has established itself before the national and international Earth Sciences community, being chosen by younger and more experienced researchers to publish original and unpublished research results. We look forward to expanding the journal's penetration in 2023 while reiterating our confidence in the invaluable value of disseminating good-quality science. To properly conduct the continuous flow of manuscripts in an Open Journal Systems (OJS) environment, authors of manuscripts are asked to consult the submission rules – with due attention to the insertion of metadata referring to each work in three languages, as stated in the guidelines for authors. Each author must be registered in the ORCID system from the first data entry in the OJS process. There must be an effort for readers, authors, and evaluators to consult and review registration data with the journal. Outdated profiles often hinder editorial agility.

Useful rules about co-authoring

It is worth repeating a question mentioned in the 2022 editorial: the problem of the effective authorship of manuscripts (“publish or perish?”). Including a person as co-author of a scientific work meets, on the one hand, the pressure for better intellectual production numbers, but other interests are at stake. The criteria and requirements to define an authentic co-production in the field of Science, according to Huailani-Chavez (2019), includes the co-author's ability to assume “responsibility for the content of the work or scientific quality and ethical transparency”. Petroianu (2012) proposes a score table, with values between 6 and -5, to measure whether the inclusion of a co-author is relevant or not. The list also helps to establish the order of co-authorship, depending on the weights assigned to each item. The maximum values include “creating the idea that originated the work and elaborating

hypotheses” (6 points) or “structuring the work method (6 points), going down to the category of simply “presenting minor suggestions incorporated into the work” (1 point), or even “participate with specific payment” (-5 points).

References

Terræ Didatica adopts the bibliographic reference standard of the American Psychological Association (known as APA), one of the most common in high-penetration journals. The publication manual is not free (<https://www.apastyle.org/products/4200066>), but several websites have detailed instructions. The link www.ige.unicamp.br/terraedidatica is maintained on the IG-Unicamp Portal, but all visitors to that address are redirected to the link on the Scientific Electronic Journals Portal (PPEC) of the State University of Campinas:

<https://periodicos.sbu.unicamp.br/ojs/index.php/td>

To everyone who helped us produce each page of volume 18, which we finalized on this occasion, we record our acknowledgments. Good reading.

The Editors

Campinas, January 2023.

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