Invited Lecture

Approaches for an inclusive teaching and outreach in geosciences

M. Gomez-Heras[1]

[1]*Department of Geology and Geochemistry, Universidad Autónoma de Madrid, C/ Francisco Tomás y Valiente 7, 28049 Madrid*

miguel.gomezheras@uam.es

There is an increasing urgency to make science more accessible and inclusive as a way of increasing the scientific literacy of the overall population. Article 27 of the Universal Declaration of Human Rights (UDHR) says *EVERYONE has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits* [1] The Convention on the Rights of Persons with Disabilities Article 4f highlights that one of the general obligations of the signatory countries is *to undertake or promote research and development of universally designed goods, services, equipment and facilities* [2]. Hence, guaranteeing the most universal access to science is not an option but an obligation. Moreover, when over 80% of the people will experience some sort of disability during their life. Besides legally recognised (and, very often, unrecognised) disabilities, inclusive science outreach needs to care for people without recognised disabilities who live in challenging environments (secluded rural areas, marginal suburbs, hospital, prisons, etc.). Therefore, non-inclusive teaching and outreach risks leaving a large majority of people out of the scientific knowledge, which impacts on the overall scientific literacy of our societies, leaving the door open for misconceptions and false news to spread rapidly through social media. In addition to the intrinsic value of scientific knowledge, accessibility entails caring, which improves self-perception (Positioning theory). “Positioning" is the mechanism through which roles are assigned or denied, either to oneself or others. Positive social support (perception that one is cared for or has assistance available) can lead to an individual attaining higher mental functioning [3].

One way of ensuring accessibility is Universal Design for Learning. The concept of Universal Design has been adapted from architecture to be applied to education and this talk will present how to approach the principles of Universal Design for Learning in the preparation of materials and activities related to Geosciences undertaken in the context of formal teaching, informal learning and outreach. Some case studies of experiences in the classroom and outreach experiences including people with disabilities will be presented with the aim of inspiring attendants to design their activities, so they are physically, cognitively and sensorially accessible.

Being ambulatory accessible means people with functional limitations that cause them to be semi-ambulatory or non-ambulatory may readily enter, leave and circulate within; Being cognitively accessible means people with functional limitations caused by impairments of cognition can readily access information in a comprehensive way; Being sensorially accessible means people with functional limitations caused by impairments of sight or hearing can access the full information presented.[4]

[1] United Nations General Assembly. Universal Declaration of Human Rights; United Nations General Assembly: New York, NY, USA, 1948

[2] United Nations (UN). Convention on the Rights of Persons with Disabilities; United Nations: New York, NY, USA, 2006.

[3] Vygotsky, L.S. (1997) The History of Development of Higher Mental Functions In: *The Collected Works of L. S. Vygotsky*. Volume 4. New York: Plenum Press. (Edited by R. Rieber.) Bunge, H. J. (1982). *Texture Analysis in Materials Science*. London: Butterworth.

[4] Gomez-Heras, M.; González Soutelo, S.; Castelo Ruano, R.; García Juan, L. The Challenge of Accessibility to Heritage around the Via Francigena: The Potential of Thermal Heritage for Accessible Tourism. Heritage 2023, 6, 7115-7125.

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