



European Medical Students' Association

Association Européenne des Étudiants en Médecine

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Science Literacy

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The European Medical Students' Association (EMSA) represents medical students across Europe. We envision a healthy and solidary Europe in which medical students actively promote health. EMSA empowers medical students to advocate health in all policies, excellence in medical research, interprofessional healthcare education and the protection of human rights across Europe.

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Problem statement

The phrase "scientific literacy", which dates back to the 1950s, has been used in literature to represent a variety of meanings, from a general understanding of science to a specific goal of science education. However, no clear consensus on its exact definition has been reached. In light of this conceptual uncertainty, five crucial elements that interact and build upon one another to form the idea of scientific literacy can be identified: basic literacy, scientific expertise, context-based knowledge of science, critical thinking and engagement (CULT Committee, 2019).

The idea of science literacy has grown through time to include the practical applications of scientific knowledge, with a scientifically educated population being seen as a crucial requirement within society. As a result, scientific literacy encompasses more than just knowledge of scientific principles. It can be characterized as the ability of a reflective citizen to interact with scientific issues and scientific concepts in a social setting (OECD, 2017, p. 22).

Nowadays, the rapid evolution of science and technology has provided people with unlimited opportunities to access and share increasing amounts of mass data and information on a global scale, through multiple digital and non-digital media (Kovalova, 2021).

Pseudoscience and science-related misinformation are being spread, and this poses a growing threat to European cultures because it could have far-reaching effects on the populace. Contemporary science-related contentious topics with substantial ramifications for people, communities, and society include the COVID-19 pandemic, climate change, immunizations, gene editing, and artificial intelligence. These issues may directly or indirectly affect human health within cultures (Howell and Brossard, 2019).

Epidemics and pandemics are often accompanied by an infodemic, which calls for new skill sets to be applied to public health in order to comprehend and manage the deluge of information, including mis- and disinformation. The COVID-19 pandemic was no different. Four fundamental elements of scientific literacy—problem-solving, critical thinking, oral and written communication, and the capacity to analyse data—are needed to build a broader perspective in a variety of science-based subjects (Cabreja-Castillo, 2023).

Graduates who lack the abilities necessary to keep up with the rapid advancements in science may result if students continue to have low levels of scientific literacy throughout time. The medical education system needs to be aware of this relative lack of scientific literacy skills while waiting for educational reform at the school level and must concentrate urgently on measures like appropriately designed research methodology capsules and social media literacy initiatives targeted at the medical student community (Mohan, 2020).

Meanwhile, the level of scientific literacy in Europe tends to be evolving but still remains insufficient. According to multiple studies trying to measure and assess science education in the EU, it is evident that the average share of underachievers in science is 20.6% while the engagement of

students in science-related activities outside of school is generally low and appears to be higher in Western and Northern European countries and lower in Eastern and Southern European countries. (CULT Committee, 2019). These results can indicate that science education in school is not able to raise the interest of students sufficiently. On the contrary, nearly 9 out of 10 EU citizens (86%) are optimistic about the global influence of developing science and technology and their positive impact on our way of life in the next 2 decades (CULT Committee, 2019).

Regarding EU actions of dealing with the issue through decision and policy making, there's still much room for improvement. Many EU countries support a contextualised understanding of scientific literacy in their school science curricula, with some references to other components of scientific literacy such as critical thinking and active engagement. (CULT Committee, 2019). The discrepancy between educational aims and expected learning outcomes signifies an inconsistency within the curricula.

For all of these reasons, it is more important than ever that people learn how to synthesise, filter, analyse, examine, and verify the information offered by many sites in order to make logical, evidence-based judgments. Conflicts of interest must be disclosed for the public to continue to have faith in the integrity of the scientific method (UNESCO, 2021).

The scientific community has to reevaluate the entire "science information lifecycle" in order to improve public outreach and close the gap. This covers the manner in which the scientific community generates scientific knowledge, the manner in which it is repackaged and disseminated by media outlets, and the manner in which people encounter this information and form opinions about it (Howell and Brossard, 2019).

Our view. Aim

In EMSA's vision, science literacy is defined as having the know-how about science, about how the scientific method is done and why people make decisions as a result of data interpretation (and also based on previously discovered facts), and not merely an opinion or hearsay. It is crucial to distinguish facts proven by experiments from the rest. That has been one of the biggest difficulties that the Scientific Community has been having so far.

In EMSA, one of the main pillars is Medical Science. Its goals and mission is to engage medical students in becoming the dynamical force that develops healthcare in its different levels throughout scientific research. For attaining these goals, EMSA has created several opportunities, from creating small working groups to elaborate booklets, to dynamizing webinars, courses, and much more.

Science literacy is educating oneself to possess a comprehension of the immediate environment, niche and eventually the legacy of mankind and in its essence, retains relevance for it unlocks the ability to make informed decisions and foster critical thinking. As EMSA, we believe that science should be a part of teaching, not just part of academic pleasantries but also in a more diverse

and profound fashion. The idea is to enable younger minds to shape their headspaces into a more logically driven and aware one, to promote healthy engagement of younger generations in the public discourse.

The European Medical Students' Association firmly believes that science literacy is the sole defense against false information, deceptive statistics, and manipulative tactics by anti-social elements in this period of unprecedented access to information from around the world. One can only critically evaluate information and produce results that are advantageous to us if they are educated on the given idea. People will be able to choose better leaders, better policies, change institutional systems to prioritize wellbeing over capitalistic profits and even take care of their own health, which will help society grow.

Recommendations

EMSA calls on NGOs (including but not limited to UNESCO) to:

- Promote educational approaches based on fact-checking and 'inoculation' to misinformation;
- Encourage students to participate in scientific research in order to ensure the sustainability of scientific data bases;
- Support teachers acquiring relevant training, but not limited to training on learning methods
- Arrange or at least aid in setting up courses for the general public about science literacy in order to reduce the harmful effects of the spread of misinformation, and meanwhile strengthen the culture of science in the general public;
- Encourage individuals to get familiar with the numerous terminologies used in different nations to refer to the idea of "Science Literacy" in order to prevent mixing the key ideas of all those notions.

EMSA calls on National Ministries of Education, National Governments and European Institutes to:

- Establish institutions to create an educational environment for all people who are willing to learn and educate themselves;
- Determine the main consequences of misinformation, disinformation and superstitions in the general public and devise a long-term plan to reduce inaccurate information and to enhance the inadequate environment;
- Guarantee that all instructors nationwide, from kindergarten through university, and those who provide information to the general public, receive regular education to ensure the quality and innovation of their materials;
- Develop guidelines for people to determine which sources of information are accurate and reliable;
- Inspect the information channels in the society like newspapers, internet or social media, on a regular basis and specify precisely the general procedures of sharing information with the general public.

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EMSA calls on **Executive Teams of social media platforms** used across Europe to:

- Be careful with accuracy and reliability of statements over the entire process of creating content;
- Be sensitive to limiting the spread of false and potentially destructive beliefs, such as by enforcing dissuasive penalties against accounts that deliberately propagate false information and disbeliefs, publicising the outcomes of these actions so that users may see them;
- Display the sources that they have based on in the section of 'references', if they are a social media platform sharing scientific information to people.

EMSA calls on **European medical faculties** to:

- Conceptualise science literacy in medical curriculum;
- Consider setting science literacy benchmarks for different levels of medical education.

EMSA calls on **educators, researchers, and medical students** to:

- Promote interdisciplinary research and data collection to provide free access to the resources;
- Advocate innovation and lifelong learning in science literacy;
- Encourage the society to obtain accurate information and indicate the importance of being capable of critical thinking to be able to use the information appropriately.

EMSA commits itself to:

- Conduct small-scale debates among students, under the supervision of academists so that students can get the support while needed;
- Generate an issue or a website within FMO in relation to recent news in science or wrong beliefs;
- Provide small-scale workshops on media literacy to protect students against the spread of false information and disinformation.

EMSA calls on **EMSA FMOs** to:

- Organise workshops to develop peer-led science literacy training sessions;
- Promote the inclusion of Science Literacy problematics in the medical curricula.

EMSA calls on the **public** to:

- Participate in community-based strategies aimed at bridging linguistic gaps, incorporating service users' and the public's perspectives, and securing commitment to science literacy promotion initiatives;
- Recognize the risks associated with digital health-related information and develop the skills necessary to filter false input.

References

1. Cabreja-Castillo, M., Hernandez, L., Mustafa, A., Hungria, G., & Bertoli, M. T. Covid-19 scientific literacy in medical and nursing students. *Journal of Microbiology & Biology Education*. 2023; doi:10.1128/jmbe.00219-22; Retrieved March 20, 2023 from <https://journals.asm.org/doi/10.1128/jmbe.00219-22>
2. Howell, E. L., & Brossard, D. (2021). (Mis)informed about what? What it means to be a science-literate citizen in a digital world. *Proceedings of the National Academy of Sciences of the United States of America*, 118(15), e1912436117. Retrieved March 20, 2023 from: <https://doi.org/10.1073/pnas.1912436117>
3. Kovalova, Oksana , The “Scientific Literacy” Concept in the Terminological Field of Science Education in English Scientific Discourse, 2021. DO - 10.32405/2309-3935-2021-2(81)-18-24- Education and Development of Gifted Personality; Retrieved March 20,2023 from: https://www.researchgate.net/publication/353857877_The_Scientific_Literacy_Concept_in_the_Terminological_Field_of_Science_Education_in_English_Scientific_Discourse
4. Mohan L, Singh Y, Kathrotia R, Cariappa MP, Khera A, Ghosh S. Scientific literacy and the medical student: A cross-sectional study. *Natl Med J India*. 2020 Jan-Feb;33(1):35-37. doi: 10.4103/0970-258X.308242. PMID: 33565486; Retrieved March 20,2023 from <https://pubmed.ncbi.nlm.nih.gov/33565486>
5. Research for CULT Committee - Science and Scientific Literacy as an Educational Challenge; Retrieved March 20,2023 from: [https://www.europarl.europa.eu/RegData/etudes/STUD/2019/629188/IPOL_STU\(2019\)629188_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2019/629188/IPOL_STU(2019)629188_EN.pdf)
6. The Organization for Economic Cooperation and Development (OECD): Scientific Literacy. 2017; Retrieved March 20, 2023 from: <https://www.oecd.org/education/school/programmeforinternationalstudentassessmentpisa/33707226.pdf>
7. UNESCO Science Report 2021; Scientific literacy: an imperative for a complex world; Retrieved March 20, 2023 from: <https://unesdoc.unesco.org/ark:/48223/pf0000377448>