

The Pandemic's Precipitate: Reconsidering Biology and Health Literacy

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Introduction

We are currently going through unusual times as the world is subjected to a pandemic caused by the corona virus which results in COVID-19, a new infectious disease affecting the human upper and lower respiratory system, amongst others and spreading through person to person contact. The gold standard to protect public health since the pandemic outbreak is evidence-based policymaking with politicians in the UK and elsewhere invoking 'the science' as their advisor and advocator for their actions (or the lack thereof). Decisions on preventing the spread of the COVID-19 are being urgently and rapidly made on the basis of expertise and ever evolving scientific data on the mechanism by which the virus invades the human body and how it is transmitted from human-to-human.

Making informed decisions about the COVID-19 pandemic: Realistic or Utopic?

Politicians, who are actively engaged in such policymaking, are rightly relying on expertise as in many cases they are neither scientifically literate to the level that would be ideally required in order to make informed decisions in health and science-related issues, nor they have the depth of scientific knowledge required. Consider, for example, the case of the British parliament where in 2015, only about 8% of MPs had science or science related degrees (Hunter & Holden, 2015). Similarly, there is no other option for the average individual than to rely on experts, as they cannot have a sufficient depth of knowledge to be able to make rational, scientifically informed decisions on the basis of COVID-19 pandemic-related evidence.

Even for professional scientists, it is rather unlikely that they have a scientifically informed opinion on every science related issue that may be outside their area of expertise. In addition, due to the current COVID-19 pandemic being an evolving situation with data on the number, type and spread of the infection from human-to-human constantly changing, even experts within this area often recognise the limitations of their current knowledge and disagree on the best approach and advice to protect public health. For example, there has been a lack of consensus on the use of medical face masks, with multiple organisations initially claiming a lack of scientific evidence to advise that they should be worn, to more recent suggestions that the widespread use of face masks had a role in restraining outbreaks in some Asian countries (Cohen, 2020). Even expert advice on policy needed to limit the spread of the virus has been questioned and criticized on the grounds that the highly precautionary lockdown measures imposed are based on rather exaggerated information and non-evidence-based measures (Ioannides, 2020).

This article neither aims to take a stance on the suitability and appropriateness of the measures imposed to prevent the spread of the virus nor to add to the discussion on the interpretation and understanding of available COVID-19 data, and besides, this would be outside the authors' area of expertise. However, the fact that even highly qualified scientists can disagree, raises the question as to what can realistically be

expected of the average individual who, with some very basic knowledge of school biological science, attempts to arrive at an understanding of the measures, the need for their imposition and, more importantly, the willing obedience to the related policy.

'Google-it' in the era of COVID-19 'infodemic'

Measures to prevent the spread of COVID-19 continue to cause stress as they are disrupting normal life. Information, or rather misinformation, communicated through media and social platforms gives rise to misconceptions of both the virus itself, its spread mechanisms and lockdown measures, thus resulting in further anxiety and distress. Since the start of the pandemic, COVID-19, as a search term, has dominated the internet and now belongs to the most popular google searches amongst at least 232 countries (Strzelecki, 2020). In a survey conducted in Britain early in the pandemic outbreak, it was found that 42% of adult Britons are getting their COVID-19 information from social media, but only 22% and 16% access such information from the Local/National government and health professionals -the ones that would have the most accurate and up-to-date information- respectively (The UK coronavirus Survey, 2020). Fake news and misinformation on the pandemic within social media range from origins of the virus and non-scientific unproven cures to the rejection of the preventive measurements and the most extreme forms of irrational thinking, pseudoscience and conspiracy theories. This article argues that the relatively high percentages (Krans, 2020) of individuals surrendering without resistance to accepting such misinformation and believing in conspiracy theories about the COVID-19 pandemic highlight the lack of, and therefore need for, meaningful and functional science education, and in particular biology and health literacy.

The need for meaningful and functional biology and health literacy

The article argues for the need of functional biology and health literacy that would enable the individual to make rational and informed decisions about a broad range of biology and health related issues. This argument is in opposition to the broad consensus of widespread scientific literacy needed for a *nullius in verba* -take nobody's word for it- way of thinking and decision-making, which has been questioned elsewhere (Abrahams, Constantinou, Fotou & Potterton, 2017). Such thinking and decision-making on an understanding and interpretation of evidence and information relevant to the pandemic that, as stated above, even experts disagree on, would be unachievable and rather unrealistic. Instead, the health and biology literacy needed should focus in greater depth on those areas of biology (like the influenza virus biology, for example) and public health (like the devastating consequences of an epidemic/pandemic on humanity) and should be meaningful in the sense that such knowledge can be seen as relevant and applicable for the individual, and functional in that it would enable them to confidently apply and integrate it into personal behavioural good health decisions and actions.

In critical cases like the one we are currently experiencing, individual and public preparedness, along with system preparedness, is key for dealing with the complex real-life problems related to the course of the pandemic. Living in a democratic society, gives (and should give) citizens freedom in their everyday choices, but in cases like the current pandemic this can be proven detrimental as without the understanding of some basic biological science knowledge, health and personal hygiene, taking the right precautions, protection measures and immediate action to restrain the pandemic would become problematic.

Police forces in England and Wales, for example, had to enforce 3,493 fines for breaching lockdown laws related to COVID-19 between March 27- April 13 (Hockaday, 2020). It is estimated that this

disobedience could possibly be one of the reasons for the increase in infection rates since 69271 new COVID-19 cases appeared during that period (Worldometers, 2020). Health and biology literacy in this case could have helped the individual realise that they could have been potential vectors of the disease and understand the underlying reasons. However, there is a lack of such literacy as the characteristics of viruses and their transmission mechanism from human-to-human are topics secondary school students hold a variety of misconceptions on (e.g., Romine et al., 2013). Biology and health literacy would have helped people to grasp the reasons behind the imposed measures and recommendations of policymakers and thus be in a better position to reflect on the outcomes of their everyday actions.

The science of COVID-19 and the health policy in response is of course different from the science literature needed say, for example, of how regular hand washing and the use of soap and water protect against the coronavirus *per se*, but the promotion of functional biology and health literacy should go beyond such issues and take into consideration every aspect of people thinking and decision making; and aim at developing the critical skills needed to determine the reliability of their information sources. For example, behavioural insights and the psychology underpinning the appeal of conspiracy theories prominent in our digital lives, should be within the toolbox of biology and health, and more generally science, literacy. This would help the individual to understand that the pandemic and its spread in this case, is not as simple and predictable as the conspiracy theories claim. A more holistic scientific literacy would provide people with better tools in thinking beyond their personal interests; and thus, limit the extent to which they reject the advice of experts when there is no other option for them to rely on.

The need to promote such functional biology and health literacy goes beyond the school science classroom as lack of such knowledge and understanding affects all people at all ages. For instance, nearly half of European adults have reported a limited health/biology literacy which results in difficulties in taking care of their own health and that of others (Sørensen et al., 2015), with the elderly being affected more by low health literacy than any other groups (Buck, 1998). It is also a long time since they were at school, and there would be less teaching of biology then, especially in boys' schools – and biological knowledge will have changed significantly since then. Thus, the promotion of functional biology and health literacy should focus on the wider population and on all different age groups (children, adults and the elderly) so that the general public is enabled to make rational and informed decisions about a broad range of biology and health related issues and not depend on social media and false expertise in such decision making. This, for school students, could be achieved through a greater focus and depth on those areas relating to human biology and public health in the science curriculum of all educational levels. For the older groups, science education and healthcare professionals should build and enhance their partnerships with the local communities they serve and open new opportunities for education programmes that would focus on an ongoing reminding of issues related to personal hygiene and public health like those described above. This will not only help in complying with government policy, and thus improve its implementation, but will also promote the levels of biology and health literacy required for higher living standards, now and after the COVID-19 pandemic.

Conclusions

It is unrealistic for the average individual to have a sufficient breadth and depth of knowledge to form rational and scientifically informed opinions on the epidemiological science behind the COVID-19 pandemic. However, what the pandemic has highlighted is the need for widespread, functional and meaningful biology and health literacy for every individual, whatever their age, and society as a whole, which is essential for the prevention of such communicable diseases. Echoing Paakkari and Okan's (2020) argument, the need for the individual to be biology and health literate should be viewed, more than anything else, in relation to individual responsibility and social solidarity.

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