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Human Genetics: leveraging the path for science education in 2020

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Human Genetics: leveraging the path for science education in 2020

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Abstract

Science and technology education plays a vital role for decision making in an informed society. Recently, with the 2019/2020 pandemic, a sudden surge of interest in science issues has been observed, particularly in health sciences and technical matters related to the pandemic. However, lack of scientific knowledge and capacity to evaluate, with confidence, the many types of information suddenly available led to conflicting actions and considerations. The prior oversimplification of science education, and underestimation of the understanding capabilities of the student and non-student populations, resulted in a loss of interest and loss of potential future careers in science. Genetics has species-specific variations, however the basics apply not only across species but also across biological discipline. The discipline of Genetics goes beyond the human species and this should be the paramount power of genetics education. Clearly the recent wave of interest in Science should be the force towards a change in the way information reaches the public. In spite of the type of target-audience, a more informed society will have more positive attitudes and will be able of empowered choices. There are many ways to implement an easier access to science. This work focuses on the experience of Portugal, a small country with a few good examples. A more informed society will be more interested and active regarding informed choices at the basis of many social, environmental and health procedures and developments.

Introduction

- Biologic entities vary due to various factors and the technology tools undergoes rapid evolution allowing the assessment of additional aspects and, sometimes, generating conflicting data.
- Science is multidimensional and dynamic, it is through discussions with peers, creation of networks and peer evaluation that Science becomes trustworthy.
- The communication of scientific findings requires technical terms but if we want to get the message across to a vast target audience, we need to avoid losing the message because of the use of scientific jargon. Misinterpretation of scientific language may lead to loss of impact, lack of trust of erroneous understanding of the facts.

Methods

- Formal educators need great communication skills but the skills for better science communication are different and the approach has to be more receptive and open, providing an informed basis for discussion and dialogue. Passing on the idea that scientific information is under dynamic change requires flexibility and a constant effort.
- In Portugal, there's a Program called "Ciencia Viva" that aims at establishing a permanent dialogue through various formats (1). This program, sponsored by the Ministry of Science and Technology, engaged collaborations with research institutions and fostered the interaction between institutions and the community. *Ciencia Viva* supports the curiosity of students and inspires scientists to communicate in formats that differ from those used in schools (1).

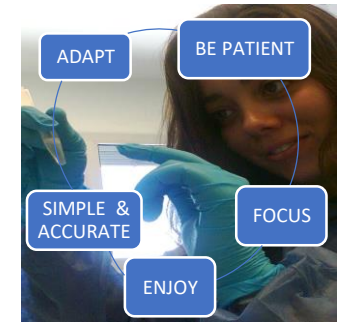
References:

- 1) Reviewed in Quint & Amaral EIHG 2019. DOI: [10.1038/s41431-019-0541-z](https://doi.org/10.1038/s41431-019-0541-z)

Figure 1. Examples of formats used by various research institutions and feedback from those initiatives



Figure 2. Tips for scientist's involvement



Results

- Taking advantage of the fact that people easily identify with Human Genetics, due to natural curiosity about genetic diseases or traits, activities in the field of Genetics easily draw the attention of the public (Fig.1 & 2).
- Different formats are used in order to achieve a better contact with the communities. Examples of formats used by various research institutions: **Formal**: Short term internships, lectures., projects, guided visits, workshops; **Non-formal**: Thematic exhibitions, open weeks, open days, hands-on activities; **Informal**: Thematic contests; short on line videos; podcasts.
- Human Genetics has leveraged different forms of science education and since it encompasses basic concepts and novel technologies used across various sciences, these approaches are widely applied (Fig.3).

Conclusions

- Human genetics can provide easily understandable means to communicate scientific contents
- Variety of approaches ensures more engagement
- Relying on digital means may help attaining larger audiences with less costs. Presently we have seen the rapid switch to digital, which can facilitate communication and further complement "in person" activities.

Figure 3. *Ciencia Viva* engagement from all fields, adapted from [1] Student participation - 1997 to 2018

