The key to eliminating gender bias is to change perceptions of women

Shamila Nair-Bedouelle[1]

At the height of the COVID-19 pandemic, male voices often dominated scientific commentary in the media. Why? There may be more women than men with a doctoral or equivalent degree in health sciences in many countries but the great majority of leadership positions in the public health service tend to be occupied by men. This suggests that, when television and radio journalists began searching for a high-ranking personality from the medical field to interview on their programme during the COVID-19 pandemic, they found a pool of male candidates that was much bigger than the pool of female candidates. This will have had a trickle-down effect, with the lower number of women in leadership positions in the public health sector translating into fewer female experts appearing on television and radio during the pandemic. These optics are deceptive and may have fuelled a public perception that scientific experts in the health sector tend to be men.

Gender stereotyping is even more likely to occur in fields of science and technology where women are in the minority even at graduate level. For instance, women make up just 28% of graduates of engineering worldwide and 22% of professionals in artificial intelligence, according to the *UNESCO Science Report* (2021), even though

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these are some of the very fields which are driving the Fourth Industrial Revolution and, thus, many of the jobs of tomorrow.

So, women are less likely than men to occupy positions of power but also technical roles. When women are less visible, this situation can foster gender bias and gender stereotyping. It also deprives high-level decision-making and research and innovation of the female perspective. Women themselves have a stake in participating in the digital economy to ensure that the Fourth Industrial Revolution does not perpetuate gender bias. Artificial intelligence is already defining societal priorities and algorithms reflect the mindset of the person who designs them. Some smartphone applications have been found to contain gender bias. For instance, Siri, a servile female-gendered voice assistant used by millions of Internauts, had been programmed to respond to insults with the words, 'I would blush if I could'. The algorithm behind Siri was updated in 2019 to react in a more gender-neutral way by saying 'I don't know how to respond to that'. If we take another example, a growing number of employers are using algorithms to rate job applicants and these algorithms are not always doing so in a gender-neutral way. Of course, the best way to avoid gender biases in algorithms is to have both men and women on the team that is developing the algorithm.

The key to reducing gender biases and stereotyping is to ensure that women are always part of the conversation. This means that both men and women need to become accustomed to seeing women in technical and leadership positions. Once this becomes the norm, perceptions will evolve; people may not even realize that they have come to view women in power or women wearing hard hats as the norm.

At UNESCO, we are working with various partners to change perceptions about what is the norm for girls and women. Let me give you a couple of examples. We joined forces with the Fondation L'Oréal in 1998 to create the For Women in Science

Programme. By rewarding excellence, this programme supports outstanding women in their scientific career, while promoting positive role models that young girls and women – as well as men – can look up to. In 2019, the programme extended its international awards to include mathematics and computer science, in recognition of the lack of visibility of women in fields which are at the heart of the Fourth Industrial Revolution. To date, the For Women in Science Programme has recognized 122 laureates, more than 300 mid-career scientists and about 3,900 young scientists from more than 100 countries. Several of the L'Oréal-UNESCO laureates have gone on to win the Nobel Prize! This was the case for Emmanuelle Charpentier and Jennifer A. Doudna (Noble Prize for Chemistry, 2020), Ada Yonath (Nobel Prize for Chemistry, 2009) and Elizabeth Blackburn (Nobel Prize for Physiology and Medicine, 2009).

Currently, women make up 37% of tertiary graduates in science, technology, engineering, and mathematics (STEM), according to the UNESCO Institute for Statistics. In 2017, UNESCO launched the #1MillionGirlsInSTEM campaign, together with Women in Engineering, a non-profit organization, to change the perception among girls that some professions are out of bounds to them. The campaign is using a combination of outreach initiatives and education in STEM to mobilize 1 million girls in at least 10 different regions over 10 years. One initiative has been dubbed the 'Think Pink Hard Hat' challenge; within this initiative, a series of workshops are being conducted globally for girls aged between 13 and 17 years to encourage them to consider a career in engineering. So far, over 20,000 young women from the following countries have benefitted from this programme: Australia, Botswana, Brazil, Canada, Colombia, Eswatini, Ethiopia, France, Indonesia, Kenya, Malawi, Mauritius, Mexico, Namibia, Nigeria, South Africa, Tanzania, the United Kingdom, United States of America, and Zimbabwe.

Convincing girls and young women to embark on a career in science and engineering is not the only challenge. We also need to ensure that the conditions are in place for them to thrive in this type of environment. That means ensuring that women enjoy equal opportunity and equal pay. Today, that is not the case in either academia or the business world, which is why some women are opting to cut short their careers.

In academia, women's work remains underrepresented in high-profile journals, according to the *UNESCO Science Report*. Recent studies have shown that women are less likely than men to be first or last authors of scientific papers, that they obtain fewer promotions and less research funding than men. Women are also invited less often than men to present keynotes at conferences or to sit on expert committees. Worldwide, one in three researchers is a woman but women account for just 12% of members of science academies. It was not until 2014 that the first woman was awarded the Fields Medal, the most prestigious prize in mathematics; her name was Maryam Mirzakhani.

In the business world, fewer than one in four researchers is a woman. Studies have shown that women are underrepresented in technical roles and leadership positions in many companies, such as in the multinational corporations that dominate the new digital economy. In many cases, women are leaving tech companies in greater numbers than men, often citing a feeling of being stalled in their career. Corporate attitudes are evolving, however, as studies link investor confidence and higher profit margins to having a diverse workforce. A growing number of countries are imposing minimum quotas by law for the appointment of women to the board of directors of publicly traded companies.

Women who lead start-ups find it a struggle to attract venture capital. According to a survey by TechRadius of 700 companies around the world, women-led start-ups

attracted just 2% of venture capital in 2019**.** The survey also found that women were almost twice as likely (58%) as men (31%) to find the gender funding gap for venture capital a cause for concern!

The overwhelming majority of those who decide where venture capital is to go are men. If we take the example of the European Union, only 13% of decision-makers are women in the European venture capital industry; 93% of all funds raised by European venture capital-backed companies went to all-male teams in 2018. In venture-capital-backed European start-ups in 2018, just 6% of CEOs and 2% of Chief Technical Officers were women, according to the *UNESCO Science Report* (2021).

In conclusion, one could say that we are making progress towards gender equality but not rapidly enough for women to take their rightful place in the Fourth Industrial Revolution. There is no time to lose: 60% of the children starting primary school today could be employed in a job one day that does not yet exist! It is today that we must begin preparing our girls and boys for the world of work of tomorrow.

About the Author

Shamila Nair-Bedouelle took up Shamila Nair-Bedouelle took up her new duties as the Assistant Director-General for Natural Sciences at the United Nations Educational, Scientific and Cultural Organization (UNESCO) in April 2019. A strong advocate for enhancing womens' role in science and engineering, she launched UNEP's first training program for women technicians. Nair-Bedouelle holds a Ph.D. in life sciences from the University of Capetown in South Africa. She pursued her research career at the Institut Pasteur in Paris then within the pharmaceutical industry at the Massachusetts Institute of Technology. She has published in numerous scientific journals and is the co-inventor of several patents. She has been

the Director of Research at the University of Paris V in France since 2000 and was nominated as the First Class Director of Research at INSERM in 2017. From 2002 to 2007, she was seconded from INSERM to the European Commission to serve as the Scientific Officer and the Deputy Scientific Coordinator of Scientific Programmes. In January 2007, Nair-Bedouelle was seconded from INSERM to the United Nations Educational, Scientific and Cultural Organization (UNESCO) to head its Ethics of Science and Technology program. Eighteen months later, she joined UNESCO's Sector for Natural Sciences as the Chief of the Unit for Africa's Science and Technology Consolidated Plan of Action within the Division for Science Policy and Capacity-building. Here, she managed the United Nations Cluster for Science and Technology in Africa and represented UNESCO at the African Ministerial Council for Science and Technology. As the Coordinator of the Working Group on Gender Equality at UNESCO from January 2010 onward, she launched the first Science Camp for Girls in South Africa and coordinated science education projects on the continent. Africa remained the focus of her work at the Africa Department, where she evaluated UNESCO's scientific programs on the continent from January 2012 onward before taking up her new functions as the Director of OzonAction at UNEP.