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Editorial

This issue of GST has been produced in extraordinary times. Over the past six months the Covid-19 pandemic has swept across our planet, affecting the lives of people in every continent and country, many sadly dying or losing loved ones, and changing the way we work, study, socialize as well as affecting the livelihoods and security of millions.

The GST Editorial Team and Board wish all our readers well and thank everyone who has contributed to the production of this issue – editors, reviewers, authors - despite the constraints and additional stress of these times.

There are five papers and a case study in this issue. The first three papers report on studies with secondary level school children in three different countries – Austria, USA and England. Two further papers look at the career progression of women STEM academics working in higher education – in Sub Saharan Africa and the US. And finally, we have a fascinating case study about the historical contribution of three Catholic sisters to scientific discoveries.

Advancing Black Girls in STEM: Implications from Advanced Placement Participation and Achievement by Jemimah Lea Young, Jamaal Rashad Young, and Robert M. Capraro, analyses the performance of Black girls in the US in the AP exams. Advanced Placement (AP) exams are an important milestone for entry into university degree courses. The study (analysing 32,675 AP exam scores from across 7 science and 3 mathematics disciplines) found that Black girls participate in certain mathematics and science courses more frequently than others. For example, they are more likely to take biology than other non-healthcare related STEM subjects, with the result that this may restrict the range of STEM subjects they can take at degree level. Two explanations are offered to explain the participation trends. Firstly access, which includes lack of appropriate subject specialist teaching, and lack of career advice/counselling as well as few identifiable mentors and role models. This leads to avoidance, with fewer Black girls selecting certain AP exams. However, among those that do attempt these subjects, the outcomes are much better than averages across all learners.

Bernhard Ertl and Sabine Zauchner-Studnicka's paper Game-Based Learning for Facilitating Equity in ICT focuses on the gender gap in Austria, one of the countries with the highest gender differences in PISA science and mathematics scores. They report on project Mit-Mut aimed at supporting girls aged 13 to 14 to increase their motivation and self-concept in ICT by a game-based learning approach. The students took part in a social enterprise network role play game for about six weeks. Analysis of qualitative results show that during the game the girls developed skills and competencies in ICT and through the use of role models, developed a greater awareness of the range of careers available in ICT professions.

The third paper, Gender and parental education as indicators of students' engagement with STEM subjects, authors Alessandro Siani, Sarah Anne Marley, Christopher Smith, and Jack Donnelly carried out a study in UK secondary schools. A survey was carried out of 504 students aged between 14 and 18. Two results – that boys were more likely to state a preference for STEM subjects, and that few students of either gender could name a female scientist – were not particularly surprising. But they also looked at where students found out about science, by asking about their choice of science news sources, and found a statistically significant association between parental education and pupils' choice of science news sources, whereby participants whose parents/guardians have a university degree are more likely to mention them as a source. This has implications for educators and policy makers – to ensure curriculum design provides opportunities for creating an awareness of diversity amongst scientists and encourages access to different science news sources.

Moving to higher education, Millicent L. Liani, Isaac K. Nyamongo, and Rachel Tolhurst offer an innovative framework to map the careers of researchers in sub-Saharan Africa, something that has rarely been addressed. In their paper Understanding intersecting gender inequities in academic scientific research career progression in sub-Saharan Africa they propose a theoretically rigorous gender analysis framework that is relevant to sub-Saharan Africa (SSA) and accounts for variations among both women and men. The framework is based on a literature review of emerging theories and empirical evidence on the dimensions of and reasons for the prevailing gender inequities in higher education institutions in SSA. Their integrated conceptual framework demonstrates that women's (lack of) progression in academic/scientific research careers is shaped by intersections between gender roles and social power relations of gender within the family, wider society and academic institutions themselves.

Helga Van Miegroet and Christy Glass also address the issue of academic women's career progression in their study of a western U.S. university. The paper Recognition through awards: a source of gender inequality in science? draws on Acker's gendered organizations perspective. Despite an increase in the number of women among STEM faculty over time, women remain underrepresented among research award recipients, especially at the university level. The ratio of research to non-research awards for men is 3 to 6 times that of women faculty, with women reporting being overlooked in the nomination process for all awards. The study concludes that the university nomination and selection processes put women at a disadvantage when they are being evaluated for high-status research awards. To counteract this, the authors propose greater transparency, formalization and accountability in the nomination and selection process, and greater diversity within the nomination pools and decision-making bodies.

Finally, the case study by Peggy M Delmas Foremothers in STEM: Celebrating the work of Catholic sister scientists, depicts the life stories and scientific contributions of some of the earliest and most influential women scientists in the U.S. who were Catholic sisters. In a fascinating set of vignettes, the author explores why three of these sisters pursued scientific study, scientific contributions, and how their experiences compare to that of other women scientists. Based on archival data from women's religious communities and universities where they were employed, similarities between the experiences of sister scientists and other women scientists emerged included mentoring, marginalization, and religious discrimination. What differed in the experiences of sister scientists was their financial obligation to and support from their religious communities, and their regard of science as worship.

We hope you enjoy reading the papers in this issue. Keep well and stay safe.

Clem Herman, on behalf of the editorial executive: Helen Donelan, Barbara Hodgson, Carol Morris, Gunjan Sondhi