Chapter 13
Engendering the Field of STEM

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ABSTRACT

The participation of women in STEM disciplines has remained quite dismal. Only 35% of scientists in the world are women, with a gender gap in STEM at 55%. Various socio-cultural taboos, gender stereotypes, lack of awareness of parents, and a patriarchal mindset of the society have divided the domains of STEM knowledge according to gender. It is imperative to mainstream gender at all policy making levels and embrace woman governance in the field of STEM. Reducing the gender gap in STEM will help in reducing gender gap in skills, increase employability and productivity of women, and be a tool for reducing occupational segregation which in turn will lead to faster economic growth. Concerted efforts are needed to boost the confidence of girls and hone their talent in the field. The chapter aims at examining the current state of women participation in STEM, assessing the gender gap existing in the field, identifying the reasons responsible for the least participation of women in science and technology, and working out the ways and means for engendering the field of STEM.

INTRODUCTION

Education is the most powerful means of achieving gender equality and empowering women economically, socially and politically. Both education and gender equality are an integral part of 2030 Agenda for Sustainable Development Goals (SDGs) and also catalysts for the achievement of all other SDGs. While access to education for women has globally improved, important disparities continue in their participation in education and the world of work. Globally, more women than men are enrolled in universities. Women represent 54% of world's university graduates, 56% post-graduates and 46% doctoral degree holder (Alicia, et al, 2020). Despite the remarkable gains that women have made in education and the workforce over the past couple of decades, a significant gender gap has persisted across countries in Science, Technology, Engineering and Mathematics (STEM) disciplines; with the lowest female enrolment observed in information, communication and technology (ICT); engineering, manufacturing and construction; and natural science, mathematics and statistics. In the 20 leading economies, women account for 26% of workers in data and artificial intelligence, 15% of workers in engineering, and 12%

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of workers in cloud computing (Alicia, et al, 2020). Too many girls are held back by discrimination, biases, social norms and unfair expectations which influence the quality of education they receive and the subjects they study. Women leave STEM disciplines in disproportionate numbers during their studies, in their transition to the world of work and even during various career stages. Leaving out girls and women in STEM education and careers is a national loss.

The acronym 'STEM' (Science, Technology, Engineering and Mathematics) originated in the 1990s, but gained recognition after it was used by Colwell at the National Science Foundation in 2001 (Hallinen, 2015). Since then, the term has been used in diverse educational policy contexts, with regular references to STEM courses, STEM workshops, STEM careers, STEM skills, STEM curriculum, STEM mindset etc. STEM is an integrated educational response to the future of work and life preparedness, promoting the development of critically important 21st century skills, allowing its composing subjects to be linked to technology, focusing on transformative learning while embedding it in the local cultural contexts, promoting inclusion through experiential education, and is situated firmly within the agenda to achieve sustainable development. It also takes learning beyond classrooms and textbooks, to stimulate creativity and purposeful innovation, alongside building the agency and everyday life problem-solving capacities.

The future of work, which would be led by exponential growth in technology and digitalisation, makes STEM arguably the most relevant and fast-growing discipline in the education sector. While advancements in gender equality have led to economic growth in many contexts, in STEM the potential benefits are even greater given the capacity to develop solutions for current and emerging world problems. STEM innovations play a central role in solving global challenges, such as overcoming disease, protecting the environment, increasing energy access and efficiency, and enhancing education Therefore, expanding and developing the STEM workforce is a critical issue for government, industry leaders, and educators. STEM is often a foundation for well-paid careers that boost the economic security of women, and in turn give them a greater social and political voice. As women are the most underutilized talent in business and growth, they are more likely to miss the opportunities the emergence of new technologies brings. Women represent the untapped human capital that, if properly leveraged, would enhance the STEM workforce, given that they comprise 50% of the population and more than 50% of the college-bound population. STEM education is also a key for preparing students for the world of work, enabling entry into in-demand STEM careers of tomorrow.

As global advances are characterized by ever-faster innovation cycles, disruptive technologies, and digitization, the careers in STEM fields, driving innovation, inclusive growth, and sustainable development, are increasingly turning out to be the 'jobs of the future'. Some of the STEM skills like creativity, communication and critical thinking are considered to be 21st century skills and skills such as Artificial Intelligence (AI), computing, data analysis, computer science and Information technology (IT) are emerging as skills of current and future importance. Given the prediction that automation and AI is taking over 50% of human work in the next 15 years, creativity and creative jobs are predicted to stay (Belsky, 2020). Workforce projections show that nine of the 10 fastest-growing occupations will require significant scientific or mathematical training (Catherine, et al, 2010). Up to 80 per cent of jobs in South-East Asia will require basic digital literacy and applied ICT skills by the year 2030(UNESCO, 2019). Many science and engineering occupations are predicted to grow faster than the average rate for all occupations, and some of the largest increases will be in engineering and computer related fields, in which women currently hold fewer positions. Much of the future job growth is projected in STEM and much of any country's competitiveness, quality of life, and national security is fuelled by advances in STEM education and research. A McKinsey report has highlighted that bridging the gender gap in