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Leveling the playing field by enhancing women's engagement in STEM



UNIVERSITY OF BERGEN

By addressing access and current inequalities for women in STEM vocational schools and professions in South Korea, we can address SDGs 1, 4, 5, and 9.

The Sustainable Development Goal target: Equal Education 4.4 and 4.5; Gender Inequality 5.5, 5C; Industry, Innovation, and Infrastructure 9.5

3 key points

- The gender bias and cultural stereotypes in South Korea creates a gender gap in the access to various professions, especially STEM vocational training.
- Lack of access to STEM positions increases women's vulnerability to the automation of jobs traditionally designated to them.
- Due to the competitiveness of jobs and educational opportunities, women are even more at risk of poverty due to wage disparities.

Introduction

South Korean women are often overlooked for positions in STEM, are disproportionately not in or successful in STEM vocational programs. When women are hired, they are paid substantially lower than men in equivalent positions. The results of these actions are South Korea's inability to achieve SDGs 4 and 5, quality education for all and reducing inequality respectively. This inequity will continue to result in South Korea losing substantial amount of earnings for its economy, losing new innovation and entrepreneurial ventures in line with the targets of SDG 9 "Industry, innovation and infrastructure", important for the prosperity of the country. Consequently, we will increase the poverty gap (SDG 1) particularly for low-skill jobs and traditional jobs filled by women that are being automated.

Decreasing the gender gap, and thereby enabling South Korea to better achieve SDGs 4, 5, and 9, can occur with the following measures: changing how women are recruited and treated in vocational schools, increasing public marketing with images of women in STEM positions, and enforcing public policies to enable women's success in STEM courses. These three changes will ensure that South Korea will not be in the bottom of the gender gap ratings as measured by OECD, UNICEF, or WEF, and substantially achieve the different SDG's by 2030.

Women are traditionally employed in jobs demanding low STEM skills that are being progressively automated. Consequently, female employees face a higher level of unemployment worldwide. Inequalities in the access to education do not affect men and women equally, with women more affected by discrimination, financial access and difficulty balancing work and life. Moreover, in some countries with a long history of traditional patriarch models, the old narratives of repressing the women voices are still prevailing despite all the attempts to change policies in order to reduce inequalities.

Even though nowadays women are graduating with more degrees than men in South Korea, due to the extreme competitiveness in the workplace, men are the ones being hired as organizations fear the loss of man hour during the child-care break. In this context, the fact that only about half of women are participating in economic activity and in STEM-related fields, has become a concern for South Korea officials (Lee, 2010).

Analysis

The gender-responsive STEM education has been recommended by UNICEF (UNICEF-ITU 2020) as a key strategy to transform opportunities for women. This involves reshaping the teaching practices by grounding them in real-life problems and lived experiences. Some Korean colleges that have High-Impact Practices (HIPs) in teaching, which refers to a set of practices that foster effective student-faculty contact and cooperation among students, have been found to have a positive effect on career aspirations of female students in STEM majors (Jin et al., 2020). The introduction of similar HIPs in the teaching pedagogies at the primary, secondary and senior-secondary school levels, has a strong potential to encourage young girls to aspire to a career in STEM early on in life.

Female science and mathematics instructors might serve as role models for girls interested in STEM (Lim & Meer, 2017). It seems that a female mathematics or science school teacher raises the probability that a female student will enroll in advanced STEM tracks in high school and aspire to pursue a STEM major in Korea (Lim & Meer, 2020). Such teachers may provide more opportunities for girls to express themselves and participate in related activities and change their perception of themselves and their beliefs about their future and related choices.

Underrepresentation of women in STEM in the school textbooks, popular media, and families, has been found to impede young girls from having a STEM-oriented career aspiration. A pilot program introduced in the selected pre-schools of Columbia focused on alleviating the gender stereotypes by developing teaching guides, tutorials, activities, a web series, computer games and interactive posters, that taught children STEM-related concepts. Additionally, the local government sent text messages promoting gender equality and information on careers in STEM to the households. The outcome of the program showed a significant reduction in gender stereotyping among teachers as well as households and enhanced the young girls' career aspirations in STEM (Inter-American Development Bank et al. 2019).

Furthermore, previous research has shown better performance by mixed-gender teams compared to homogenous teams. All-male groups are less likely to deal successfully with dynamic social changes and challenges of the modern market. Diverse groups might bring a different perspective to a male-dominated workplace and a fresh way of looking at things in the hard sciences and technology (Shin, 2009). Introducing such mixed-group STEM-related activities at the school level could facilitate the cooperation and understanding of both the genders towards each other's significance in STEM relatively young in life. It has thus been argued by UNICEF that it is critical to retain young girls' interest in STEM at the school level which can then translate into their uptake of STEM-oriented vocational training, higher education, and jobs (UNICEF-ITU 2020).

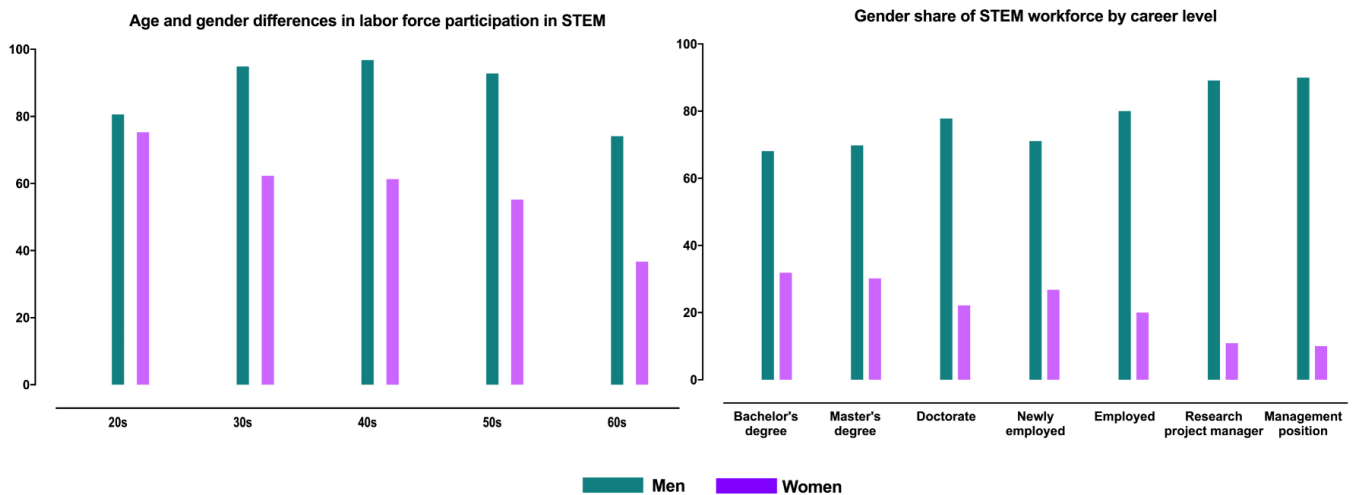


Figure 1. Gender differences in labor force participation and career level in STEM in South Korea, 2018

Source: "Report on Women and Men in Science, Engineering & Technology 2009-2018", available in <https://www.wiset.or.kr/eng/main.jsp>

Conclusions

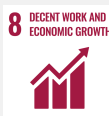
Gender inequalities in STEM labor market continue to be an issue in South Korea: according to OECD data only 30% of STEM workers are women (OECD, 2012). Male students continue to dominate STEM education at all levels, hampering female involvement in the STEM labor market. Currently, there is a special vocational training program in South Korea that targets women (MOGEF, 2017), but despite STEM VET training can provide fairness to women by training skills, data showed that discrimination in employment persists. South Korean women involved in VET programs continue to face a gendered socioeconomic sector, and they tend to get more precarious jobs (WISET, 2019).

There is a lack of interventions aimed to address the social obstacles that women face in the STEM labor market. Improving attraction to curricula, reducing recruitment barriers and bias in the hiring process, and boosting retention and career advancement are essential elements to address this problem. The improvement of retention and building capacity of women in STEM through social interventions will foster the economic growth as well as female development in South Korea.

Recommendations

1. Strengthen the implementation of HIPs and close monitoring of the results from implementing HIPs in existing STEM programs.
 - a. Pay specific attention to teams having more than one women.
 - b. Ensure gender-responsive HIPs at the school level to boost young girls' STEM-oriented aspirations.
2. Train and monitor teachers to ensure that they are encouraging BOTH females and males in STEM courses.
3. Increase Public Service Announcements and publications to show women in STEM courses and jobs.

Further relevant SDGs:



IMPRINT

SDG Bergen Science Advice in collaboration with Bergen Summer Research School's 2021 PhD course holders professor Birgit Kopainsky, Dr. Hiwa Målen and Dr. Ingunn Johanne Ness.

Relevance to the 2030 Agenda

SDGs 4, 5, 9, and 1 are all part of equalizing education, reducing inequality, and increasing innovation and infrastructure which are aimed to achieve the 2030 Agenda; in addressing these specifically, this policy will also address the pending and increasing poverty for women in South Korea, thereby addressing SDG 1, reducing poverty.

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