

WOMEN IN STEM EDUCATION

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Abstract. *This paper presents the aim of women in the STEM field. The 21st-century demands have influenced the emergence of women in STEM. Equality in rights, educational reforms have influenced the appearance of women in more fields. Drawing on a study the number of women in STEM has grown. Regard that there are a lot of stereotypes about women in these fields. But also there are a lot of girls that disturb these stereotypes. However, the slow advancement of women in scientific fields remains a persistent problem, especially in academia; some girls think that they are not as good in technical skills as boys.*

Keywords: *stereotypes threat, scientific fields, academic career, education.*

Introduction

Science, Technology, Engineering, and Mathematics (STEM) is a huge domain that is made up mostly of boys. However, women have been making significant strides to improve their numbers over the last few years. But the percentage of women remains to be around 30%. These numbers indicate a leak in the system that, admittedly, could be due to many other plausible reasons: for example, women do not see professorship as an attractive career or women make other career choices and other life choices. This problem creates a huge self-diffidence to other girls and they choose to do not to have a career in this domain. Now, it is time to disturb all stereotypes and show to the world that STEM is also for girls.

Stereotypes about women in STEM

There are a lot of stereotypes about women in the STEM field. These stereotypes make women feel unconfident in them. Women decide to let their potential and to inhibit their skills in the domain that are considered not so large, a domain that does not need knowledge in different areas of STEM. Because of this, women decide to avoid jobs in this sphere, more than that they even avoid studying in the STEM domain. Just enter in a technical university, you will see there more than 70% of boys, this is because girls avoid studying in STEM because of the stereotypes. “The fear of confirming these negative stereotypes, known as stereotype threat, causes women who are personally identified with the domain to underperform and disidentify with the field” [1]. The fear of the stereotypes does not allow girls to develop in this domain. One of these stereotypes is that boys have better technical skills than girls. In ancient times boys studied technical subjects while girls were taught more creative activities like dancing and writing. Now the situation has changed and our schools provede the same cources where bouth girls and boys develop the same skills. So, no more stereotypes: males and femeles have equal rights. Actually the roots of misperceptions of education start from childhood when parents buy cars for boys and dolls for girls and aproach in my opinion totaly wrong. This attitude reinforces the idea that males must develop technical skills and fermales creative ones.

Statistics about Women in STEM

Some statistics show the small rate of women in the STEM field. For example, WEF The Future of Jobs report says that when there are new STEM opportunities, women gain only 1 new STEM job, while men gain 5. This shows us that there is a problem involving women in the STEM domain. “The slow advancement of women in scientific fields remains a persistent problem, especially in academia” [2]. In Figure 1 is presented the share of men and women at three academic career levels in UE-2009.

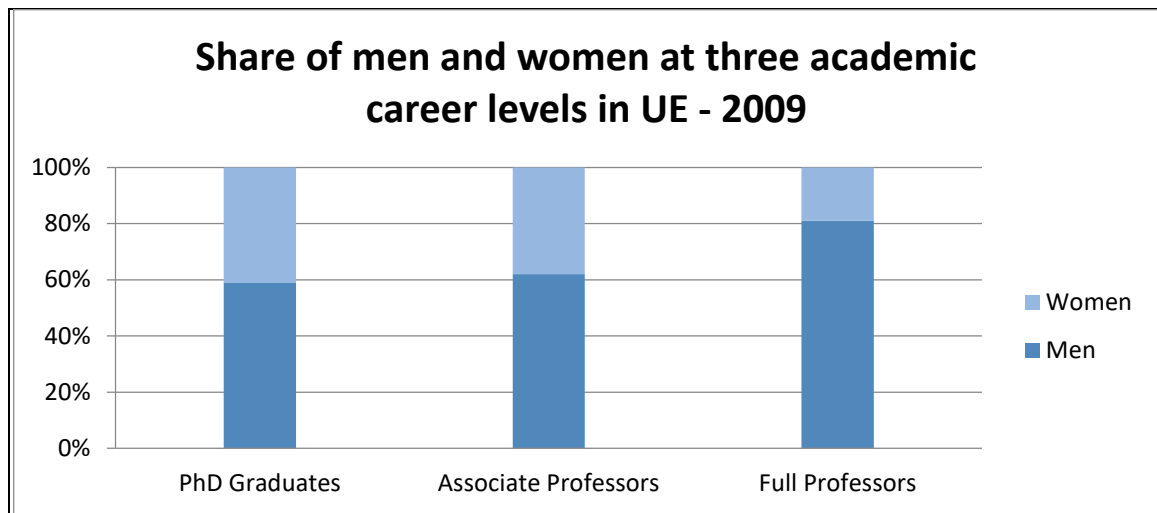


Figure 1: Declining representation of women in later-stage career posts in academia

As follow in this figure we can see the decline of women in later-stage career posts in academia. It shows clearly that as we move further on the career stages, the percent of women visible shrinks. So, with fewer than 20% of full professors being women. The first column describes the percentage of women that are Ph.D. graduates. This number decreases twice in the third column. Unfortunately, even if women graduate from a STEM specialty, later they do not follow their degree. One of the reason why this number decreases drastically could be the lack of women in leading position. One the one hand, this is still an enigma because no research has fully demonstrated it. On the other hand, some research tshows that a womens example of a leader increases the enthusiasm for learning in girls. An experiment has made with two groups of students formed only by girls. One group was mentored and taught by a man, the other one by a woman. Both groups have written the same tests, but they got different results. The girls that ware mentored by a woman have shown better results than the other girls. This research shows us that being guided by women influences and inspires girls to perform better.

According to the recent UCAS data provided by HESA, 35% of STEM students in higher education in the UK are women. The UCAS data for students studying computer sciences related degrees, only 19% were female, with a staggering 81% of students being male. Similarly, the percentage of female students studying engineering and technology degrees made up a mere 19% of the total students between 2017 and 2018. The better result is in physical sciences were 39% of students were female. In the same period, the percentage of female students studying mathematical sciences was just 37%. To take a parallel between 2009 and 2015 thinks do not change. The number of women in the STEM field remains to be around 20%. Only a small grown is observed, but for 6 years it remains to be a small evolution.

Organizations promoting girls in STEM

To increase the number of women in the STEM field some organizations created projects to show that girls can build their careers in STEM fields as good as boys. These kinds of projects are Django Girls, Tech Women, and GirlsGoIT. Django Girls [3] is a non-profit organization and a community that empowers and helps women to organize free, one-day programming workshops by providing tools, resources, and support. TechWomen [4] empowers, connects and supports the next generation of women leaders in science, technology, engineering and mathematics (STEM) from Africa, Central, and South Asia, and the Middle East by providing them the access and opportunity needed to advance their careers, pursue their dreams, and inspire women and girls in their communities. A project that I take part in is GirlsGoIT, it is dedicated to girls that want to have a career in IT. With 5-year experience, GirlsGoIT [5] program encourages girls and young women to go in the field of technology from a young age, choosing STEM (science, technology, engineering, and mathematics) education path and empowering girls and young women in and through technology to have better future education and employment opportunities. In 2017 I first

meet this project and create my first web page. Later I learned 3D Printing a Python at the Summer Camp. Thinking about GirlsGoIT and the opportunities it offers, I want to be a mentor in this project, motivating the girls to choose IT.

Famous women in STEM:

A lack of role models has been cited as a reason why many women do not enter into STEM careers. According to PWC’s 2017 report on Women in Tech [7], only 22% of students interviewed in the report could name a famous female working in technology, compared to two thirds who can name a famous man working in technology. However, the technology industry does have many high-profile women who have made waves in their industry like Karen Spärck Jones, Martha Lane Fox, and Dorcas Muthoni. For example Karen Spärck Jones (26 August 1935 – 4 April 2007) was a pioneering British computer scientist responsible for the concept of inverse document frequency, a technology that underlies most modern search engines [8] or Dorcas Muthoni (born 1979, Nyeri) is a Kenyan an entrepreneur, computer scientist and founder of OPENWORLD LTD, a software consulting company she started at the age of 24. Through her work as an entrepreneur and computer scientist, Muthoni seeks to see technology positively transforming the lives of the African society, governments and enterprises [9]. They are good examples of success that must inspire every girl that want to begin a career in STEM field.

Growing percentage of women in STEM

Throw years the influence of different organizations and the changes in society like the equality in rights determined the growing percentage of women in the STEM field. I will focus on TIC, a compartment of the STEM field. In Figure 2 is shown the percentage of girls that will work in the TIC domain according to the PISA data with darker color is represented by girls from Moldova with other color girls from OECD countries.

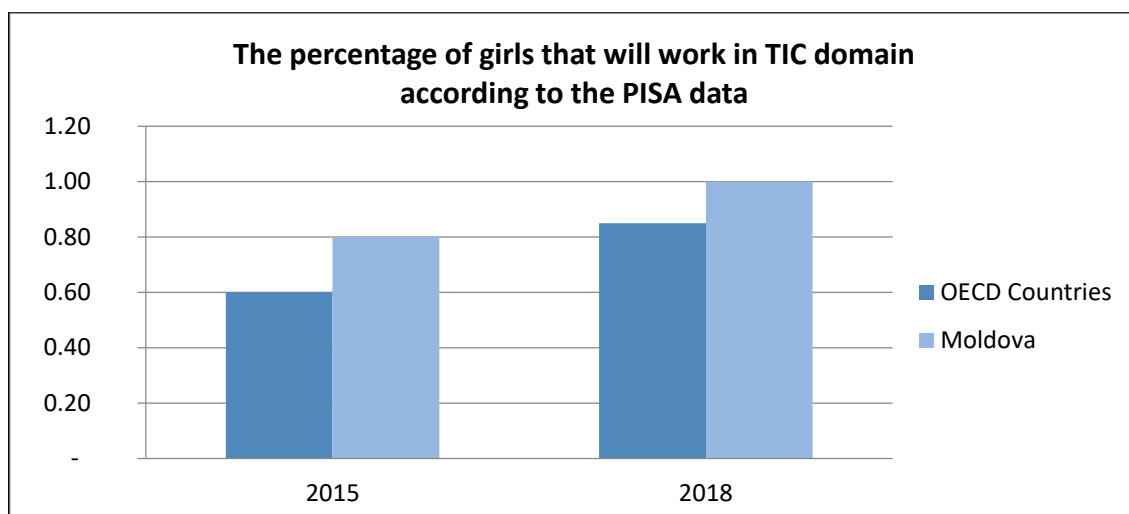


Figure 2: Number of girls that will work in TIC domain

In 2015 from 100% of girls that graduated there was only 0.6% in OECD countries and 0.85% in Moldova that wanted to go to work in the TIC domain. In 2019 the number increase, so from 100% of girls that graduated, there are 0.8% in OECD countries and 1% in Moldova that want to go to work in TIC. The table has presented the average in OECD countries. It is exciting that the number of girls that want to have a TIC career in Moldova is bigger than in other countries, but it remains to be a very small number. The labor market is searching every day for good specialists in this domain, but unfortunately, the small number of girls is a visible problem in big companies, because girls consider that it is not a good career for them.

Conclusion

STEM is a huge domain that has enough space for everyone for self-development. Think that a woman - Ada Lovelace has been called the world's first computer programmer. So, you are not alone and you will not be the first. You just need to have a try and you will see that this enormous domain will attract you. At the same time, STEM is not only about exact material, but it is also a way of interacting with people. So don't be afraid to create your future. STEM is a necessary field nowadays. It's constantly growing and changing, making it exciting every day. Many of us don't know how many opportunities it offers. STEM can give resources, new opportunities for learning, ways to collaborate and create. Technology is a very powerful tool for education. I want all the girls to have the courage to try their strengths in the STEM field because our society needs changes and women are the ones that can make those changes. Women, be courageous, and you will succeed. STEM is something dynamic, interesting and beautiful.

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