

In 2014 G20 countries signed to decrease the gap between inclusion of men and women by 25%. One of the gaps in inclusion of women occurs in digital inclusion area. I have below paper from young and promising graduate students at the International school of Geneva, LGB. I hope you like the awareness and the academic outlook! A big applaud ladies! Good luck in your studies!

The digital inclusion of women and the digital gender gap

Ela Sigin, Qingyang Zhang, Eden Chung, Sandra Kim

International School of Geneva, LGB

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Gender gaps can take on many forms, but the gender digital gap is one which has been increasing recently, together with the advancement and globalization of technology. The gender digital gap refers to the non-negligible difference between men's and women's ability to access technology. Despite it being a global phenomenon, it is more prevalent in certain areas than others. Consequently, the instances where a gender gap is not present will be explored, followed by the instances where it is a problem. The causes for the gender gap will also be explored, by considering whether it is caused by a natural gap based on ability or by a difference of social expectations and gender stereotypes instilled in society. Finally, the benefits of gender equality in technology will be explored and hence the reasons for investment in this issue.

The situation worldwide

The digital gender gap is a major issue in the modern world. Globally, men make up 54% of internet users while women only make up 46%¹. This equates to approximately 250 million more men than women using the internet daily². In two thirds of countries, the proportion of women using the internet is lower than that of men³. Furthermore, the largest digital gaps can be found in the less developed areas of the world. For instance, the digital gap is the highest in Africa, with a gap of almost 45%, then a gap of around 35% in Southern Asia, Middle East and Northern Africa⁴.

¹Gray, Tricia & Gainous, Jason & Wagner, Kevin. (2016). Gender and the Digital Divide in Latin America*: Gender and the Digital Divide in Latin America. Social Science Quarterly, accessed 20th April, 2020, https://www.researchgate.net/publication/301307916_Gender_and_the_Digital_Divide_in_Latin_America_Gender_and_the_Digital_Divide_in_Latin_America/citation/download

² Itu. "ITU's Approach to Bridging the Digital Gender Divide," October 30, 2018. <https://news.itu.int/itus-approach-bridge-gender-divide/>.

³ Ibid.

⁴Gray, Tricia & Gainous, Jason & Wagner, Kevin. (2016). Gender and the Digital Divide in Latin America*: Gender and the Digital Divide in Latin America. Social Science Quarterly, accessed 20th

In these areas, the main causes resulting in a skewed internet use are a lack of digital literacy skills, affordability, and network coverage.

Advantages of a digital education

The gender digital gap leads to a lower-quality education for women, but if this gap is closed, it would yield better academic results. In the study *Can one-to-one computing narrow the digital divide and the educational gap in China? The Case of Beijing Migrant schools*⁵, a randomized experiment with the One Laptop per Child (OLPC) program was carried out, and researchers concluded that the OLPC program improved “student computer skills by 0.33 standard deviations and math scores by 0.17 standard deviations.” Students learned to spend more of their time on educational platforms, and their self-esteem increased. This shows that digital education leaves a positive impact on students’ well-being and academic abilities. Therefore, there should be equal and increased access to digital education for all genders.

One can argue that access to the internet is important for educational purposes, while non-learners don’t have a great need for it. However, job opportunities, free learning platforms are widespread on the internet, which can provide opportunities for people to earn a living and increase their personal value. Therefore, equal digital literacy and access is vital for a prosperous society. Knowledge about technology is especially essential for women. Without digital knowledge, great consequences may follow. These include control over women through fake news, restraining women from participating in public and economic growth etc.

Issues encountered by women while using technology

Increase in digital access can also lead to increase in cyber harassment. Cyber harassment is most often targeted towards women. According to the Union Agency for Fundamental Rights (FRA) survey on violence against women in the EU⁶, the most prevalent age of women who have received cyber harassment in the past is between 18 and 25 years of age at 25%. 14% of women in the EU have also experienced stalking and threatening messages since the age of 15. An estimate by the UN states that 95% of online harassment, abusive language and cyberbullying is aimed at women.⁷

This noticeably high prevalence of victimisation of women reflects the society’s constructed beliefs and attitudes about gender. These gender stereotypes lead to

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⁵ Di Mo, Johan Swinnen, Linxiu Zhang, Hongmei Yi, Qinghe Qu, Matthew Boswell, Scott Rozelle, “Can One-to-One Computing Narrow the Digital Divide and the Educational Gap in China?”. Science direct, December 2012, accessed 15th Feb 2020,

<https://www.sciencedirect.com/science/article/abs/pii/S0305750X13000077>

⁶ “Violence against Women: an EU-Wide Survey. Main Results Report.” *Human Rights Documents online*, n.d. https://doi.org/10.1163/2210-7975_hrd-9992-2014010.

⁷ “Technology Initiative - Empower Women and Girls with Tech.” Global Fund for Women, May 20, 2016. <https://www.globalfundforwomen.org/our-approach/initiatives/technologyinitiative/>.

normalisation of violence against women in the media and gender inequality in the tech sector. These issues can easily hinder the perspectives of women in their use of technology. According to a research conducted by Take Back the Tech⁸, 1 in 5 women feel that the internet is inappropriate for them. Moreover, a research carried out by Amnesty International⁹ in eight countries depicts that the ill provision of safety for women on Twitter forced women to change their use of platforms such as self-censoring content which they post, limiting their interaction or even leaving the platform completely. The fear of being online for women is a great impediment to their ability to adapt to technology which can widen the digital gap between the two genders.

To combat this issue, states and countries have implemented different policies and campaigns. For example, Budapest Convention¹⁰, the first multinational treaty to provide standard signatories regarding prevention, protection, and prosecution of cyber violence, is in charge of monitoring and reporting on the state of violence against women, aiming to create common standard laws. Also, campaigns such as Safer Internet Day¹¹, celebrated in 130 different countries in order to raise awareness of these issues as well as Safer Internet Forum¹²; an annual conference of policy makers, parents, law enforcement bodies, NGOs and teachers to discuss the latest online issues aiming to look for solutions to prevent the phenomenon. These campaigns and policies can ensure the safety of women online which can enable women to access technology and reduce the gender divide.

Social versus economic causes of the digital gender gap

Despite efforts to close the gender digital gap, it persists in some countries because of overarching socio-economic issues. The gender digital divide can be associated with the gender poverty gap. In countries where the gender poverty gap is greater than the gender digital gap, the digital divide is less of an issue. For example, in the UK, 58% of internet non-users are women. 21% of women are in poverty when compared to 19% of men¹³. The UK gender pay gap is also higher than the EU average¹⁴. In reality, although the digital divide could be linked with the poverty gap,

⁸ "Online Abuse 101." *Women's Media Center*, www.womensmediacenter.com/speech-project/online-abuse-101.

⁹ "Why Twitter Is a Toxic Place for Women." Amnesty International. Accessed June 21, 2020. <https://www.amnesty.org/en/latest/research/2018/03/online-violence-against-women-chapter-1/>.

¹⁰ "Full List." Treaty Office. Accessed June 21, 2020. <http://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/185>.

¹¹ Centre, Safer Internet. "Safer Internet Day 2020." *Safer Internet Centre*, www.saferinternet.org.uk/safer-internet-day/2020.

¹² Safer Internet Day - Home. Accessed June 21, 2020. <https://www.saferinternetday.org/>.

¹³ Rep. The Female Face of Poverty. Women's Budget Group, July 2018, accessed 2nd May, 2020, <http://wbg.org.uk/wp-content/uploads/2018/08/FINAL-Female-Face-of-Poverty.pdf>

¹⁴ Gray, Tricia & Gainous, Jason & Wagner, Kevin. (2016). Gender and the Digital Divide in Latin America*: Gender and the Digital Divide in Latin America. *Social Science Quarterly*, accessed 20th

the digital gap still remains a huge problem, even in a highly developed country such as the United Kingdom.

A similar issue exists in Sierra Leone; the gender digital gap can be an effect of the gender literacy gap. In general, Sierra Leone is quite low income and few people have access to technology or to the internet. Only 13% of men and 10% of women have access to the internet¹⁵. Although neither gender has a high internet penetration rate, there is still a difference between men and women. Furthermore, in Sierra Leone, not everyone can afford education, and as a result, there is a literacy rate of 59% for males and 44% for females¹⁶. In lower income countries such as Sierra Leone, families would rather spend their money to send a son to school rather than a daughter. Since women get married off to their husbands' families (often when they are younger than 18), paying for the son's education is much more valuable for the family in the long run. In addition, many girls face teen pregnancies and have to raise their babies, preventing them from gaining the full benefit from their education¹⁷. This is a significant gap and shows that men have a better access to education. The fact that males are more literate and are more educated means they would have more opportunities and a higher income, allowing them better access to technology and the internet than women. As result, the gender gap is more stubborn in poverty-stricken countries.

A country's economic status reveals the underlying social pressure on gender roles, contributing to the gender gap. The social pressure is much more significant in causing the gender gap than the economic pressures. For instance, in a case study of year 9 students in Greece conducted in 2008¹⁸, boys were found to respond more positively to mathematics and to the use of technology in mathematics compared to girls¹⁹. In addition, high levels of confidence, strong levels of affective and behavioral engagement, high confidence in technology use and positive learning attitude to learning mathematics with technology were related to higher mathematics performance, which in turn was more prevalent in males²⁰. As a result, the use of

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¹⁵Rep. Sierra Leone 2015 Population and Housing Census Thematic Report on Gender. Statistics Sierra Leone, October 2017, accessed 3rd May 2020, https://www.statistics.sl/images/StatisticsSL/Documents/Census/2015/sl_2015_phc_thematic_report_on_gender.pdf.

¹⁶ Ibid.

¹⁷ "Africa: Make Girls' Access to Education a Reality." Human Rights Watch, June 16, 2017. <https://www.hrw.org/news/2017/06/16/africa-make-girls-access-education-reality>.

¹⁸ Barkatsas, Anastasios (Tasos), Katerina Kasimatis, and Vasilis Gialamas. "Learning Secondary Mathematics with Technology: Exploring the Complex Interrelationship between Students' Attitudes, Engagement, Gender and Achievement." *Computers & Education* 52, no. 3 (2009): 562–70. <https://doi.org/10.1016/j.compedu.2008.11.001>.

¹⁹ Ibid

²⁰ Ibid

technology is not a cure for eliminating the gender gap, and can even hinder it if not presented correctly. In fact, confidence and performance form a positive feedback loop, so the higher achieving students benefit even more from the use of technology, while lower performing students are even more discouraged and their performance decreases. The real solution to closing the gender gap is the social encouragement from teachers or mentors of females to pursue STEM fields rather than solely providing females with access to technology. This also means that a change in the gender stereotypes and a more inclusive and freer environment are necessary. Thus, increased access to technology could indeed increase the confidence of lower performing students and hence increase their performance.

There are certain areas of the world where this progress is harder to achieve because of certain gender biased laws. For example, men have a higher decision-making power in their wives' jobs rather than the woman herself in 18 countries, for example in Cameroon, Yemen, and the UAE²¹. Furthermore, in Cameroon, men can prevent their wives from taking a job if it is not in the best interest of the family. This means women cannot always have an independent source of income and could be trapped in poverty. Globally, 90% of countries have at least one law that restricts women's opportunities²².

Despite these restrictions, legal pressures are not the root of the problem of the global gender gap. The more important hindrance is caused by social stereotypes and expectations of women. Consequently, the most important factor to reduce the gender gap is to reduce gender stereotypes and veer to equal expectations from men and women.

Gender stereotypes regarding abilities in STEM

One such gender stereotype is revealed by the claim that there is a difference in cognitive abilities between genders, and even if access to technology is equal across all genders, there is still likely unequal engagement and benefits. To investigate this stereotype, researchers conducted a three-month long computer project, where grade 5 and 6 students create their own software program.²³ They found that girls' participation in the more computing-heavy activities is lower in the first three weeks, but participation in those activities evened out towards later weeks. There is a delay between creating equal access and seeing a decrease in the gender digital gap for girls and boys. The researchers are unsure whether girls' lower participation in the beginning means that they are *naturally* less technologically able, or that they are

²¹ Yosola, Olorunshola. "10 Ridiculously Sexist Laws You Won't Believe Still Exist." Global Citizen, November 28, 2016.

<https://www.globalcitizen.org/en/content/10-ridiculously-sexist-laws-you-wont-believe-still/>.

²² Ibid

²³ Cynthia Ching, Wasmin Kafai, Sue Marshall, "Spaces for change: gender and technology access in collaborative software design". Journal of Science Education and Technology, Vol.9, No.1 2000, accessed 26th March 2020,

https://www.jstor.org/stable/pdf/40188541.pdf?casa_token=2Ov19eKRKlcAAAAA:KxFpwsHguUb4WRX2adNwseGFmEk9s1tjztntGUpHm-_3WNJ-9LhwXSWaz9w-fCb_qk8mSYZqpBcN6Y4NGehndKYmfluUmdlOiTRQwVbpxPZOKzfBAJ_JaA.

nurtured to be less inclined to use technology compared to boys. This is part of the long-held debate of nature-versus-nurture, which is beyond the scope of this analysis. However, it is evident that the gender gap can decrease with positive attitude and guidance. Despite the positive outlook that the gender gap can decrease, the researchers noted that the process of gender equity in participating in technological activities was not easy: it involved a lot of intervention from the researchers. This shows that achieving gender equity in digital access, in any scale, is difficult: it involves a serious shift in the worldview of children, who have already internalised their role in the classroom. Nonetheless, the malleability of children in this study supports the claim that gender is a social construct, not something in children's nature. Children are taught to associate certain characteristics with each gender, and changing this ideology is difficult, but possible.

The claim that girls are not naturally less technologically able, and that boys and girls can be nourished by technology equally, is supported by the study done on rural, public and migrant schools in China using the OLPC program.²⁴ They found that “computer-based learning can benefit both girls and boys equally” and that there was no difference in improvement between girls and boys in maths or Chinese test scores. This suggests that China and other applicable countries should integrate computer education into their basic educational program to lower their gender divide.

Furthermore, cognitive experiments performed on undergraduate students show that while there are cognitive differences between males and females, their differences can be evened “fairly easily” with training.²⁵ This shows that the claim of a “smarter sex” is a myth, and all students should be granted equal access to education, technology and all such opportunities regardless of their gender, so that they can thrive.

Development of women's education in STEM fields

As gender discrimination becomes less prevalent, female students are more represented in their subjects. In 2007, more Bachelor degrees in biological sciences in the US were earned by female students than male students.²⁶ As shown by figure 1, the percentage of Bachelor's degrees earned by women across all subjects has consistently increased to over half the undergraduate population. Under the optimistic general growth though, lingers the worry that STEM fields are not as represented by women. Although the number of female physics undergraduates increased nine-fold, the percentage of female physics and engineering undergraduates has experienced a slow growth. Furthermore, the percentage of female computer-science undergraduates has even decreased. This means that “prestigious” fields are still male dominated. It also implies that a larger percentage of

²⁴ Di Mo, Johan Swinnen, Linxiu Zhang, Hongmei Yi, Qinghe Qu, Matthew Boswell, Scott Rozelle, “Can One-to-One Computing Narrow the Digital Divide and the Educational Gap in China?”. Science direct, December 2012, accessed 15th Feb 2020, <https://www.sciencedirect.com/science/article/abs/pii/S0305750X13000077>

²⁵ Catherine Hill, Christianne Corbett, Andresse St. Rose, “Why so few?”, Institute of education sciences, February 2010, accessed 4th May, 2020, <https://files.eric.ed.gov/fulltext/ED509653.pdf>

²⁶ Ibid

females are driven towards an undergraduate degree in the humanities or languages. The lack of female students in the computer science field may suggest that female students have less access to technology, or are simply less interested in computer science. Their disinterest could be due to a natural inclination away from the computer science field, but I believe the likely cause is the gender stereotype of computer scientists being men. Fundamentally, the digital gender gap is a social issue and will be resolved only when gender stereotypes ease.

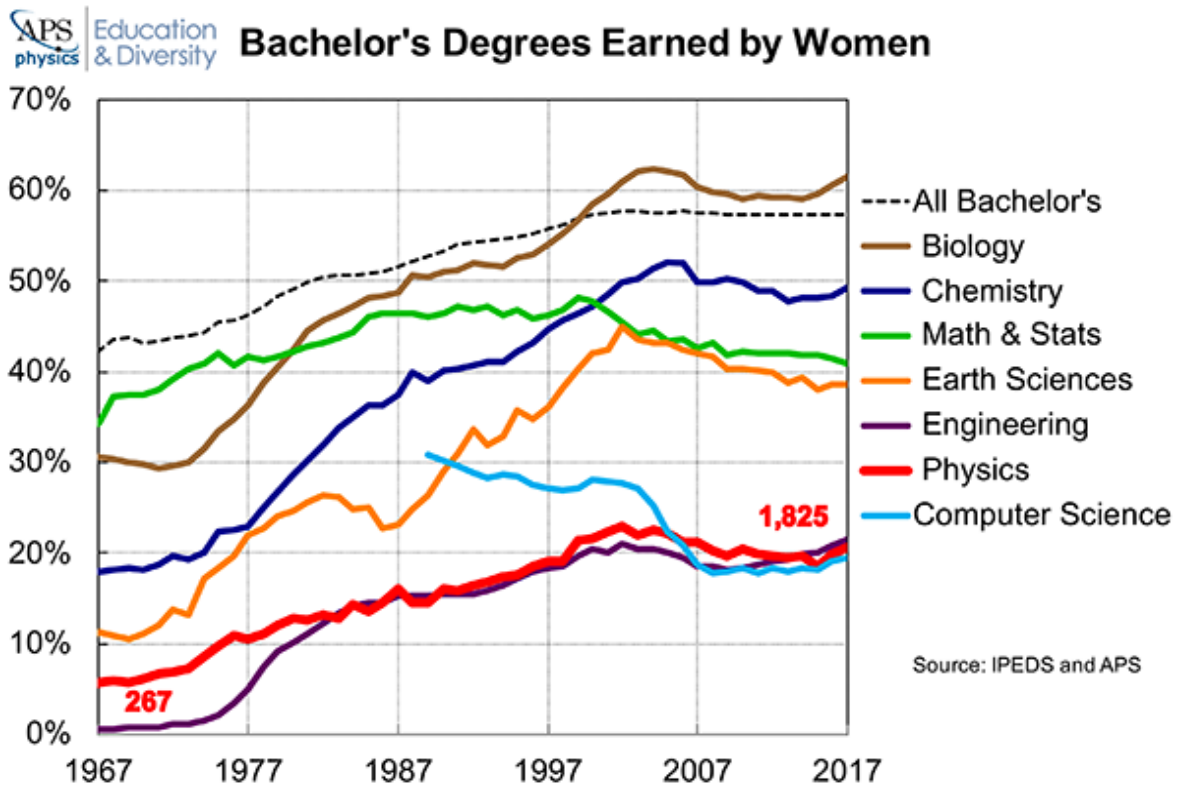


Figure 1: Bachelor's degrees earned by women²⁷

Benefits of digital equality on the economy and on society

Finally, the social and economic benefits of decreasing the gender gap should be recognised, as this would increase the interest and investment in the issue. For instance, gender diversity in the workplace has a clear positive effect on the employees and the work, which then results in increased profits. The presence of women technological innovation is needed, as it contributes to diverse views and thinking processes and methods of approach. It leads to effective and creative solutions, and the clear economic benefits can be seen. In an analysis of 22,000 firms globally, 30% corporate female leadership compared to none meant a 1% increase in net margin, leading to 15% increase in profitability²⁸. However, rather than women completing their jobs better than men, it was the increased skill diversity in

²⁷ "Bachelor's degree earned by women, by major", American physical society, accessed 7th April, 2020, <https://www.aps.org/programs/education/statistics/womenmajors.cfm>

²⁸ Noland, Marcus, Tyler Moran, and Barbara R. Kotschwar. "Is Gender Diversity Profitable? Evidence from a Global Survey." *SSRN Electronic Journal*, 2016. <https://doi.org/10.2139/ssrn.2729348>

leadership, which meant less gender discrimination throughout the company, leading to the recruitment of talent, regardless of gender²⁹.

Furthermore, women are a large economic force in the world, as they are a very important consumer group. In the United States, women control 73% of household spending, so they are responsible for 4.3 trillion USD of consumer spending out of 5.9 overall³⁰. Consequently, effective marketing towards this consumer group would provide higher revenue. However, this is not the case, as the female marketplace is left unaddressed by new technologies, potentially because of a lack of female leadership, as people do not tend to invest in areas unrelated to them. In addition, even if these areas are invested in, there is a lack of effective marketing towards women. As a result, it can be concluded that a presence of women in leadership and digital fields would produce better marketing for a consumer group they understand and would result in higher economic income.

Conclusion

To conclude, the gender digital gap is being reduced, but, along with other socioeconomic issues, it is far from being eradicated. We are aware that several case studies we consulted are outdated by five to ten years, which means that the current situation regarding the digital gap might have evolved, likely towards the better. Overall, the digital gap is an issue that coexists and intertwines with socio-economic inequalities. Women's access to technology has seen an increase globally, but internet safety measurements have not necessarily followed suit. Regarding education, technology is important in improving the quality of education for both genders, and girls should be granted equal access as boys. Finally, the root of the digital gap, and all types of gender discrimination lies in social pressure against women and removing people's gender stereotype is the big challenge in eliminating any gender discrimination. Once gender equality is achieved, we could see benefits such as increased diversity of thought and economic productivity.

²⁹ Ibid

³⁰“Buying Power: Quick Take,” Catalyst, April 20, 2020, <https://www.catalyst.org/research/buying-power/>.

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