



Gender and Education in Luxembourg and Beyond

Local Challenges and New Perspectives

Sylvie Kerger, Laurence Brasseur (Hg.)



Getting more girls and women involved in the field of technology: sharing experiences from a pioneering organisation in Luxembourg

Marina Andrieu

Gender and Education in Luxembourg and Beyond: Local Challenges and New Perspectives Herausgegeben von Sylvie Kerger, Laurence Brasseur



Veröffentlicht durch die Universität Luxemburg - **Melusina Press**, 2022 11, Porte des Sciences L-4366 Esch-sur-Alzette https://www.melusinapress.lu

Verlagsleitung: Niels-Oliver Walkowski, Johannes Pause Lektorat: Carolyn Knaup, Niels-Oliver Walkowski Cover und Layout: Valentin Henning, Erik Seitz Umschlagsbild: This cover has been designed using resources from Flaticon.com

Die digitale Version dieser Publikation steht unter https://www.melusinapress.lu frei zur Verfügung.

Das PDF und die Druckvorlage werden mit Hilfe von princeXML erzeugt. Der Druck und Vertrieb erfolgt durch BoD – Books on Demand, Norderstedt.

Bibliografische Information der Nationalbibliothek Luxemburg: Die Nationalbibliothek Luxemburg verzeichnet diese Publikation in der Luxemburgischen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über bnl.public.lu abrufbar.

ISBN (Online): 978-2-919815-31-9

DOI (Publikation): 10.26298/melusina.k4j9-c733-gmga DOI (Band): 10.26298/melusina.k4j9-c733

Das vorliegende Werk steht unter einer CC BY-SA 4.0 Lizenz. Informationen zu dieser Lizenz finden Sie unter https://creativecommons.org/licenses/by-sa/4.0/deed.de. Die in diesem Werk enthaltenen Bilder und Ressourcen unterliegen der selben Lizenz, sofern sie keiner anderen Quelle entnommen wurden oder mit einer anderen Lizenz versehen sind.



Introduction

This article presents the results of recent work (2016-2020) conducted in Luxembourg by Women in Digital Initiatives Asbl, a non-profit also known as Women in Digital Empowerment (WIDE), which tackles the issue of low representation of girls and women in STEM (science, technology, engineering, and mathematics), and especially in the field of ICT (information and communications technology). Low representation is common in most European countries as well as in Luxembourg. In this article, we take a comparative approach looking at countries within the European Union.

It must be emphasised that the number of jobs in these fields is growing and there is a clear shortage of qualified staff. One of the solutions to this problem would be to increase female representation in the sector. It seems, however, that stereotypes continue to be associated with STEM jobs. As a result, it prevents girls (even if interested) from choosing careers in STEM where there are numerous opportunities and well-paid jobs.

This article details the results of several projects (including the Girls in ICT programmes, Rails Girls, Gender4STEM, FemStem, and Lëtz Go Equal 2020), as well as identifies common stereotypes, which prevent girls from choosing scientific studies and careers. It includes a new approach to equal opportunities in formal and non-formal education. Many initiatives are taken to raise awareness, showcase role models, attract and retain women in the workforce, as well as offer differentiated activities for girls in STEM. The article suggests a need for support at a political level, and a change of perspective at a societal level (through parents, peers and educators). It also underlines the role played by the industry, including the public and private sectors.

Women in Digital Initiatives Asbl – also known and referred to as WIDE (Women in Digital Empowerment) – was created in 2013 by a group of women who wanted to challenge women's representation in the field of ICT and digital technologies.

Back then, the founders attended many industry events and were among the few women in attendance. The founding team (a blend of Luxembourg-based expats and cross-border workers in the field of technology) saw an increase in events for women in IT in the US and Europe and wanted to bring a similar concept to Luxembourg.

The first event was a real success with 100 attendees (mostly women with a handful of male participants). First and foremost, the female founders (volunteers at the event) wanted to create events and networking opportunities where women would feel more comfortable. One of the initial ideas was to provide access to coding education for women who had not chosen ICT studies but were still interested in working and launching companies and taking advantage of the growing digital economy.

A broad range of activities was then developed with regular events and activities to give opportunities to women. From the very beginning, the WIDE philosophy has been that men are welcome. They represent just 10% of the participants, which, incidentally, is the opposite of the proportion of women attending IT conferences or following IT-related courses at university.

If you think about it, the majority of world wide web services were created by men: Mark Zuckerberg, Bill Gates, Elon Musk, Jeff Bezos, and let's not forget Steve Jobs. We rarely mention the names of famous women founders in the start-up world, such as Melanie Perkins (Canva) or Sandy Lerner (Cisco). A few names might spring to mind for big companies, but none of them started or own these companies. In Europe, the lack of role models in tech companies makes it harder for society to envision girls becoming the engineers and tech founders that we need to build a sustainable future.

Since day one, WIDE has been championing the importance of gender diversity in the field of ICT. In Luxembourg, several new initiatives have been launched in the non-profit, corporate, and public sectors. The organisation expanded its work towards younger generations while continuing to focus on professional women.

We cannot ignore, however, that the situation for women in ICT and STEM has not changed much.

The percentage of women in Europe being ICT specialists working in ICT remains extremely low; they represent 18% (European Institute for Gender Equality, 2020). Furthermore, within the EU, women in leadership roles in ICT and tech companies make up only 19% of managerial positions in ICT (Women in Digital Scoreboard, 2019).

Our article details the results of several projects (including the Girls in ICT programmes, Rails Girls, Gender4STEM, FemStem Coaching, and Lëtz Go Equal 2020) and identifies common stereotypes, which prevent girls from choosing scientific studies and careers.

We take a critical approach to the current situation and elaborate on the employers who acknowledge the need for women in ICT and take this into account when defining their global strategy.

Based on our extensive experience, we offer an overview and analysis of possible strategies to attract more girls and women to tech in the near future, and to find a sustainable way to close the gender gap, by working with the public and private sectors.

Addressing the challenge of girls and women in ICT in Luxembourg

As a pioneer advocate for women in ICT in Luxembourg, WIDE had the opportunity to explore various ways of changing the situation and creating an impact. Adult women were the initial target group, but it quickly became obvious that education and working with young people were key to initiate a long-term change.

Girls in Digital: an innovative programme for all girls interested in tech

With the support of the Ministry of Equality between Women and Men (MEGA), WI-DE's work in education started in 2017.

The Girls in Digital programme was put in place to attract more girls to STEM. The initial idea was to create a community for all girls in Luxembourg with an interest in technology. We noticed that many people successful in IT had been members of the computer science club at school – previously a 'no-girls zone'. We discovered this when we participated in Gender4Stem, and these conclusions can be found in the best prac-

tices guide (Gender4Stem, 2020). A girl might not be at ease in a computer club as they may not feel welcome.

We faced several barriers when implementing the programme: first, finding a place and time that worked for the girls juggling other extracurricular activities; and, second, attracting girls with fewer opportunities is challenging. Indeed, we discovered that many girls attending were daughters of IT engineers or highly qualified parents, who knew how important tech education was. Even with the support of secondary schools and very motivated teachers, it proved difficult to attract girls who did not get the relevant support at home, and who were more influenced by peers when it came to making career decisions.

Furthermore, the choice of language for the activities was a dilemma. Many ICT specialists do not speak Luxembourgish and are not familiar with the local education system. At the same time, there was also a high demand from pupils (and parents) from European and international schools who might not have been comfortable with activities in Luxembourgish. As a result, English was used as a lingua franca, but using English risks being perceived as too 'elitist' and more geared towards expats.

In practice, we always found a way to work in different languages, and the level of English of pupils from different backgrounds was sufficient as they are exposed to a lot of media content in English. The usage of French was not an issue either, even if not the preferred language of young people who do not speak it at home.

Our experience showed that it was key to work with teachers and schools to recruit participants but that they actually had very little bandwidth to do so. Offering activities for girls only adds another layer of difficulty: as schools are mixed, it does not align with how schools are run. Indeed, diversity in schools is a social progress that has become standard since the end of the 1960s. Going back to sex-segregated activities can be complicated, even if it could eventually lead to social progress and more quality.

Girls in ICT Day

Girls in ICT Day has been running in Luxembourg since 2017. International Girls in ICT Day is an initiative launched by the ITU (International Telecommunication Union) and takes place in April every year. It aims to create 'a global environment that empowers and encourages girls and young women to consider studies and careers in the growing field of information and communication technologies' (United Nations International Computing Centre, 2020).

WIDE has been innovating with different kinds of events every year to adapt to the relevant needs and local context. In 2018, a major event was organised with the support of the Luxembourg National Research Fund (FNR). With the help of eight mentors, 50 girls from 10 different schools came together for an afternoon of activities.

This was an example of a successful collaboration with secondary schools to recruit participants and everyone who participated seemed genuinely enthusiastic. We noticed that private, rather than public, secondary schools were particularly keen on sending pupils to the event. In the evening, we held a conference aimed at girls and parents con-

sidering a career in IT. Unfortunately, it was not as successful in terms of attendance. We realised that early evening events were more appropriate for business events than for our actual target group.

In 2019, a smaller-scale event was held at the CID (Centre d'information et de Documentation des Femmes), a feminist library. Thirty people, mainly mothers and daughters, attended. The youngest attendee was 12 years old. The interactive activity was led by two successful young women who had attended the European School in Luxembourg and are now telecoms engineers.

In 2020, a similar activity with more or less the same number of attendees was organised online in partnership with Golden Z, a feminist association at the University of Luxembourg. To amplify the impact, a communication campaign featuring role models in ICT was conducted around the time of the event.

Gender4Stem: a bridge to raise teachers' awareness

Even though girls show a strong interest in science and technology in their teenage years, they surprisingly often end up choosing other pathways in their studies and careers.

Many educators commented that starting to work with girls from age 13 (secondary school age in Luxembourg) was too late for two reasons. Firstly, school subject pathways are chosen early in Luxembourg and it is difficult at this age to challenge viewpoints already formed. Secondly, teachers are not always trained to manage gender diversity in their classrooms.

Thanks to the European Commission's Erasmus+ programme, we had the opportunity to work with several partners to create an online learning platform aimed at teachers. The Gender4Stem project led to the creation of an e-learning platform (Gender4Stem Teaching Assistant), where educational and awareness-raising materials can be uploaded for use by secondary school teachers.

Gender4Stem aims to tackle the low representation of girls in STEM education. Using collaborative design methods, the main stereotype assumptions identified in the project were:

- Girls are hardworking but do not have the talent for STEM
- STEM is boring, and nerdy (and thus not interesting for girls)
- Women do not belong in STEM

Could compulsory coding in schools bring about change?

Since coding became compulsory in primary schools in Luxembourg in 2020, there is now an opportunity to show girls and boys that ICT is possible for anyone, regardless of their gender. Only time will tell if this changes the situation in the long term. In primary school, girls are as interested in ICT as boys, but when they move on to secondary school, they seem to opt for health and natural sciences. Coding from an early age is a

not-to-be-missed opportunity to create gender-neutral learning activities and combat a few common stereotypes.

In Luxembourg, putting in place girls-only activities has proven complex and, if successful, the activities were not always sustainable. The main challenge remains finding a system which allows interested girls to gather in one place, while explaining to others (boys) why they cannot join, even if they are interested.

One success story is Girls Who Code, an initiative led by Reshma Saujani in the US. The organisation has been backed by many corporates in the US, and the founder's TED Talk 'Teach girls bravery, not perfection' is now a reference worldwide (Saujani, 2016). In Europe, no major initiative has taken the lead, with local and national actions struggling to find the right resources to operate on a sustainable basis despite excellent visibility.

There are many initiatives (events and programmes) for girls and women in other countries. Copying them or bringing them to Luxembourg seems a very good idea, but they need to be adapted to Luxembourg.

Women and the ICT sector

What is the situation in companies and the workplace?

WIDE's initial strategy as a non-profit was to partner with the private sector to sustain its activities. Companies and their staff members have showed a high level of interest. Securing support and creating fair partnerships, however, has always been a major challenge for the organisation, as well as for other organisations in Luxembourg and in Europe, working in the field of gender.

The history of women in ICT

The 'geek' or 'nerd' stereotype (a boy who wears glasses, has no friends and spends most of his time in front of a computer) is still dominant in today's society. The lack of role models in STEM and ICT is part of the problem. Not many, young or old, can give names of female scientists, other than Marie Curie. Women did not have access to high standard STEM education until very recently. And when they were able to work in science or innovation, history rarely retained their names.

Recent projects shine a light on forgotten role models – from Ada Lovelace to the women scientists in Hidden Figures (Melfi, 2016), who were NASA employees (one of them Katherine Johnson, who calculated the trajectory of the Apollo 11 mission to the moon in 1969). A few women leaders do stand out: Marissa Mayer (Google's first woman engineer, who went on to become CEO of Yahoo) and Sheryl Sandberg (Facebook's number-two executive and a leader in the field of women's empowerment).

More women are needed in ICT. The challenge of attracting more women.

Many companies have realised by now that recruiting more women is crucial. First, as ICT specialists and experts are difficult to attract, working on more diversity is a pragmatic solution for broadening the candidate pool. Our organisation has been contacted many times to support the recruitment of ICT specialists.

Many managers, especially CIOs (Chief Information Officers) and CTOs (Chief Technology Officers), see that they would benefit from more diverse teams. Their motivations range from improving the working atmosphere in their teams, transforming a male-dominated culture, and fighting sexism, to bringing more innovation to the table. It has been proven that a diverse team performs better, and that having women on board can bring fresh perspectives (Hunt et al., 2018; Hunt, Layton & Prince, 2015).

Looking for more women candidates in IT right now is difficult as there are few women working in the sector in Luxembourg. As an example, we never felt that creating a job board for women in ICT was a good idea. Mathematically, the audience would be around 10% of the total number of candidates, which would not be satisfactory for companies measuring their return on investment on a service. Since 2019, a few commercial initiatives have offered dedicated events for women in ICT with a focus on recruitment and matchmaking. It seems that the lack of women in IT has now become a business opportunity.

An increasing number of women (and men) have developed an interest in the topic of women in leadership and in the workplace and are keen to see their companies getting involved. Unfortunately, we have witnessed a lack of real support at an executive level, which has stopped many initiatives. Companies often just relied on the goodwill of employees putting extra hours into the project on behalf of the organisation. CSR (Corporate Social Responsibility) initiatives seem more focused on internal matters or, on the other end of the spectrum, supporting charities with no direct link to the business.

We have always encouraged employers to support action in the field of education and help build a more diverse pipeline. It seems, however, that employers are actually looking for short-term solutions to fill open vacancies. Corporates might be inclined to spend money from their human resources and marketing budgets on immediate communication, visibility, and opportunities to share jobs with a broader network.

As a result, we have become critical of the role that companies want to play in supporting women in ICT – too often an opportunity for communication and no action. Unfortunately, we have seen cases of companies promoting the role of women in IT on social media on International Women's Day and then holding an all-male panel event the day after.

Are women welcome in ICT and why are they leaving the sector?

For women, the ICT world looks attractive on paper. It offers excellent job prospects, good pay, career opportunities with local and international companies, potential travel, as well as flexibility (e.g. working from home).

A study was conducted by the European Institute for Gender Equality (EIGE) in 2018 – 'Women and men in ICT: a chance for better work-life balance' – and will definitely need to be updated in the post-Covid world. The argument of working from home for better work-life balance is not valid in Luxembourg, as most people working in IT are cross-border commuters.

It is worth noting that Luxembourg attracts many female IT professionals from across the world. In Asia, choosing STEM studies means excellence, financial independence, and a possibility to emigrate. In richer countries (a trend was also seen in post-communist environments), young people generally tend to choose fields of study based more on personal interests.

Our work has shown that many women active in the ICT sector have had negative experiences, from sexist remarks to harassment by male colleagues. Many women reported that they did not feel comfortable wearing skirts or make-up at work for fear of not being taken seriously by their male colleagues. The presence of a glass ceiling has also been reported several times. According to the EIGE report, the number of women working as ICT technicians in Luxembourg decreased by 12% between 2012 and 2016.

We believe that the topic of women in ICT should be taken more seriously in Luxembourg. Many corporations have communicated on global plans, often around two pillars: women in leadership programmes and supporting education programmes for young girls. Despite interest from local staff, however, it seems that these programmes have not yet been fully implemented in Luxembourg.

Even though most companies (and their top management) acknowledge the problem, instating long-term action is complex. Gender and diversity issues are sensitive topics in the workplace and often lead to disagreement, resulting in a lack of real action being taken.

The #MeToo movement has created a shift: nowadays more women dare share their experiences. At the same time, the feminist movement (which can take many forms and is not just one unified movement) can be perceived negatively by some, as radicality is not welcome in the corporate world.

The rise of corporate feminism

There is growing criticism that feminism now has a neo-liberal branch, and has become a new service offering private conferences, sponsoring, marketing opportunities, and employer branding, for example. There has also been recent interest from women working in the corporate sector who are keen to get involved internally and pave the way for discussions on topics including work-life balance and breaking the glass ceiling.

Let's not forget that women in top positions do not represent the majority of working women.

The pandemic has seen commercial events focused on girls and women in ICT coming to an end. Despite enthusiasm at the outset, the vast majority have become unsustainable after a few events, probably due to a lack of support (human resources, volunteers, or financial support especially from the private sector).

At WIDE, we had doubts about these event formats, so we decided to focus on key events that could really make a difference, as opposed to competing with distinctly commercial initiatives which we believe are not the most responsible way to address this urgent topic.

There is so much work to be done and there is space for non-profit, social enterprises as well as more commercial services. However, without a certain level of commitment and professionalism, it might harm the cause, and jeopardise the credibility of the topic and the work previously done.

It is easy to say that the world needs more women in tech. Taking action and actually creating an impact is another story.

Will multiplying initiatives for women be sufficient to see change? How can companies contribute to a less gender-segregated job market, as well as more balance in leadership, executive, and board positions? Can the ICT industry collaborate effectively with the education sector to discerningly promote the industry to both girls and boys?

It is time to turn the interest of companies and employees on gender issues (not only in ICT) into a reality in the workplace. This needs organisational and cultural change.

What strategies can we use in 2021 to encourage more girls to choose STEM?

Several strategies could be adopted to encourage more girls to consider ICT as a study and career option as, at the end of the day, it must be their own decision. After seven years of being active in Luxembourg, and benefitting from numerous collaborations in Europe, we feel that we are in a position to share a few recommendations.

All actions and initiatives involving both the public and private sectors are important and can contribute to spreading important messages. Giving visibility to new role models in the sector is an excellent start.

There is a need for quality awareness-raising at all levels. It is essential to keep transmitting (and repeating) the message to young girls, but that's not all. Communication channels also need to be adapted to reach a wider audience, especially those who are professionally, socially, and geographically connected to the world of technological change and development. The sustainability of several interventions is challenging, and it is necessary to look for alternative strategies for events and social media. Incremental, less spectacular change can be also implemented every day, at school in particular.

Using "girls and women" in communication and awareness-raising

We noticed that communicating across such broad target groups with labels such as 'girls', 'women' or 'girls and women' was not ideal. Indeed, 'girls' is a friendly way to call a group of young girls or a group of friends, who are women. It is generally appreciated but can also be confusing in terms of communication. Using 'women' (like celebrating International Women's Day) can be misinterpreted by younger girls, who might not feel that they fit into this category.

Using 'girls and women' also has its challenges. While it aims to mean females of any age, it can be intimidating for both groups and risks offering activities that do not cater to the whole group. Young girls enjoy being together and having the opportunity to make new friends. Women appreciate having a space to discuss issues related to their professional lives.

We have avoided using 'female' in our communication as we feel it refers more to biological traits rather than social construction.

We have been organising Rails Girls (supported by Digital Luxembourg) since 2013 with branding, materials and topics aimed at girls (e.g. the colour pink, cuddly toys, jewellery, hairstyles etc.). This kind of communication has been very successful in attracting both girls and adult women.

It has helped to create a friendly vibe. Young girls tend to mix with other young girls, and professional women tend to mingle with other professional women. Only women and girls are welcome at this event. Given the level of interest in the event, we have had to select our participants, and being female was the main criterion. It is interesting to note, however, that half of the volunteers were men, who had never taken part in such events before. They were truly motivated by the cause of having more women in the field of IT and wanted to take concrete action and be part of the change.

Incorporating social and gender diversity in our programmes

Very early on, when organising girls-only activities, we received various comments (especially from parents) along the lines of: 'my son would also be interested' or 'my daughter is studying engineering and never needed anything like this to help her make her choice – she just does what she likes'.

As creating girls-only groups was challenging for many of the aforementioned educational, geographical and social reasons, we decided to open our activities to boys too. Our rationale was that if we can offer an activity to eight girls, why not have it benefit a larger group of young people? We took this as an opportunity to educate boys on the subject of creating gender-balanced groups, and to show them that a girl doing IT was something completely normal.

We also made sure not to offer activities only in Luxembourg City. When organising activities in the South of the country, we experienced that attracting local youth was hard (even through to local schools and youth organisations).

Getting girls from socially diverse backgrounds involved has been a major challenge due to varying school schedules, different languages and mobility barriers.

Working with teachers and educational authorities

The Erasmus+ project, Gender4Stem, is an example of a new type of intervention to help teachers innovate in their classrooms to fight gender stereotypes.

The initial idea was to create an online training platform for teachers. We quickly realised that there was a need for support from both the educational community and head-teachers to include new learning material in the curricula. A frequent remark made by teachers was the need to educate boys when it comes to gender equality.

In 2020, WIDE and MEGA decided to create an event to raise awareness on equality in the digital field. An event was held and a large communication campaign LëtzGoE-qual was implemented to celebrate International Women's Day, just before the breakout of the pandemic in Europe.

In partnership with one secondary school (Lycée Belval), an event was organised for both girls and boys aged 13 and up. It fit in well as part of career guidance activities planned by the school and took place during school hours.

The goal was to raise awareness about digital and gender issues. There was a speed mentoring session with 50 pupils (boys and girls) and 15 mentors (women working in the field of ICT). The concept was adapted from events organised by VHTO, the Dutch national expert organisation on girls/women and science/technology that aims to increase the participation of women and girls in STEM and break stereotypes, and which has been active in Holland since the early 1980s.

To reach a broader audience, we organised a public event with five women start-up founders presenting their projects. Taina Bofferding, the Minister of Equality between Women and Men, who championed the choice of digital as the main theme for 2020, took an active part in all these activities and made sure to pass the message on to young people and the rest of the audience. The event received good press and social media coverage.

Moreover, a special edition of *Silicon Luxembourg* (a magazine dedicated to start-ups in Luxembourg) was released on the day and was packed with interviews with role models and concrete tips for students looking for guidance in the field of ICT. To reach a larger audience, the magazine was distributed in workplaces and schools, with the content also accessible on the event's website.

Conclusion

First of all, there is a need for quality awareness-raising around the topic of girls in ICT. It's important to keep passing on (and repeating) the message to as many children and teenagers as possible, but also to parents, educators, and the general public.

The implementation of dedicated activities for girls, in or out of school, is important and must be accompanied by a broad communication campaign. The influence of social media in today's teenage life makes a real difference.

Eliminating stereotypes – which are too often conveyed with 'unconscious' bias – from schools is the biggest challenge. This is why we strongly believe gender issues are extremely relevant in the world of education, and projects such as Gender4Stem, inclu-

ding training and networking for teachers, are excellent ways of creating change. The importance of working with boys and educating them on gender equality has also proven to be key to the change process.

Finally, working with parents is important. Changing mindsets and getting rid of stereotypes within the family can be difficult. We know that, despite the work done at school, parents still influence their children's choices of studies, and traditional roles are still assigned to boys and girls at. This, of course, also applies to the choice of jobs or careers, which is strongly linked to the cultural, socio-economic environment. It is still very common to see that, in well-educated families, boys go for engineering and girls go for more social careers.

Digital technologies offer tremendous opportunities to women but, at the same time, the ICT industry has not yet come to terms with gender issues and the inclusion of women. We are clearly at a crossroads. Women are more at risk online. They are more likely to be victims of cyber harassment, especially on social media, or if expressing political views.

With the #MeToo movement came a shift: these subjects are now talked about more openly on social media. The media's treatment of gender issues has changed, and journalists are starting to express themselves more freely. This has caused significant backlash and criticism (sometimes referred to as 'gender fatigue' - a term coined by Elisabeth Kelan in her book "Performing Gender at Work"), making gender-related topics even more complex to navigate.

It is important to mention women in Artificial Intelligence (AI), where gender bias is becoming a critical issue. Women are using technology products developed and designed mainly by men. There is a risk that AI amplifies human biases.

We believe that gender policy should be integrated into all educational policies and should be gender-sensitive by default. 'Positive discrimination' to encourage specifically girls and women is still needed. Given the current situation, the gap is too broad to just wait for things to get better by themselves.

We believe a new approach to equal opportunities and gender in formal and non-formal education is needed. To that end, the EU Commission's programmes have paved the way and provided support when none was available at national level in many EU countries.

To our knowledge, no European country has formal policies in place for girls in ICT and STEM, but many have them on their lists of priorities and challenges. Working with teachers seems to be key to addressing the issue in education. We also believe that gender training, or at least awareness-raising, should be part of initial teacher training. Starting a career with at least basic knowledge and awareness on the topic could prove very effective.

Measuring the impact of interventions and policies is key. Qualitative feedback and real testimonials could be collected along the way. National and European statistics could better track gender segregation in the professional and education sectors. New types of indicators could be put in place, especially to measure the path of girls and students in STEM to better understand their choices and behaviours. Of course, following

a cohort of young people over a long period of time, especially after they leave school, is difficult.

Looking at the sustainability of actions taken is critical. Too many activities have been one-offs in the past, addressing only a few schools and not being renewed in subsequent years. The private sector has a responsibility in the awareness-raising process as well as to maintain the credibility of the topic of women in ICT and tech. Indeed, employers can directly contribute to both a more diverse pipeline of talent and offer fairer working conditions for women in the industry.

For nearly a decade, initiatives have been launched worldwide to raise awareness, showcase role models, attract and retain women in the workforce, as well as offer differentiated activities for girls in STEM. It is important to leverage the people who are eager to contribute to a positive change for women and society.

This article highlights the need for support at the political level and a change of perspective at the societal level (where the role of parents, peers and educators must come into the equation). It also underlines the role which can be played by the ICT industry, as well as the public and private sectors.

On the one hand, change can be created by key actions and policies: by increasing awareness-raising, making activities girls-only when possible, and communicating well beyond the direct target group. On the other hand, it is crucial to focus on changing individual and collective mindsets (e.g., adapting education in kindergartens or rethinking gender-typed toys and clothes).

Given the importance of the matter, the slow pace of organic change and the numerous potential risks, the topic of girls and women in ICT must be taken more seriously. There is a need for more collaboration, sharing of best practices, and networking to inspire change. Access to expertise, quality resources and research must be promoted and made broadly available. These resources should support the development of comprehensive company and public policies.

Gender issues can no longer be seen as just women issues. We cannot ignore the serious consequences for the economy and society at large.

References:

European Commission. (2019, 11 juin). Shaping European's digital future. Women in Digital Scoreboard 2019 - Country Reports. https://ec.europa.eu/digital-single-mark et/en/news/women-digital-scoreboard-2019-country-reports

European Institute for Gender Equality. (2018). Women and men in ICT: a chance for better work life balance Research note. https://eige.europa.eu/publications/women-and-men-ict-chance-better-work-life-balance-research-note

European Institute for Gender Equality. (2020). *Gender Equality Index 2020*. https://eige.europa.eu/gender-equality-index/2020/LU

Gender4Stem. (2020) Gender awareness and teaching in STEM. Collection of resources and best practices. https://www.gender4stem-project.eu/

- Hunt, V., Layton, D., & Prince, S. (2015). *Why diversity matters*. McKinsey&Company. https://www.mckinsey.com/business-functions/organization/our-insights/why-diversity-matters
- Hunt, V., Prince, S., Dixon-Fyle, S., & Yee, L. (2018). *Delivering through diversity*. McKinsey&Company. https://www.mckinsey.com/business-functions/organization/our-insights/delivering-through-diversity
- Kelan, E. (2009). Performing gender at work. Palgrave Macmillan
- Melfi, T. (Director). (2016). Hidden Figures [Film]. Fox 2000 Pictures
- Saujani, R. (2016, February). *Teaching girls bravery, not perfection* [Video]. Ted Conferences. https://www.youtube.com/watch?v=fC9da6eqaqg
- United Nations International Computing Centre (2020). *Girls and Women Talking Tech Girls in ICT*. https://www.unicc.org/news/2020/06/05/girls-and-women-talking-tech-girls-in-ict/