



# Policy brief

Incorporation of gamification methods as a behavioral lever for gender equality in ICT in school and university curricula

June, 2022



## Abstract

This document is developed under the GenGapsDiGi project, funded from the European Union's Rights, Equality and Citizenship Programme under Grant Agreement №101005895. It describes the challenges women are facing when participating in the ICT sector and outlines recommendations for inclusion of gamification methods as a behavioral lever for gender equality in ICT in school and university curricula.

## Challenge

The EU is experiencing a strong need for highly skilled personnel in the digital sector: a shortfall of at least 700,000<sup>1</sup> ICT professionals are expected in each of the next years. The ICT sector is experiencing much higher growth rates compared to other sectors: if average growth forecasts for occupations is 3%, for the digital sector it is 8%<sup>2</sup>. With a rapidly aging population, it is young people who will have to fill this gap.

Across the EU, there is a disbalance in the participation of women in the ICT-related labor market resulting from low participation of girls in technical higher education. On average for the EU, for every 1000 women, only 24<sup>3</sup> graduate in ICT-related fields. The main factors for gender gaps in ICT are related to the negative perceptions that this is a male-dominated sector. Such stereotypes influence the career choices of young women and thus influence the gender gap and the composition of the labor market.

The gender imbalance in the ICT sector is unlikely to be overcome without further steps, taken by national governments, and targeted intervention by all stakeholders. Concerted action and cooperation amongst all sides will address the digital gender gap and will support the participation of women in ICT.

---

<sup>1</sup> <https://eige.europa.eu/publications/work-life-balance/eu-policies-on-work-life-balance/women-in-ict>

<sup>2</sup> <https://www.cedefop.europa.eu/en/data-insights/rising-stems>

<sup>3</sup>

[https://ec.europa.eu/home-affairs/policies/internal-security/organised-crime-and-human-trafficking/together-against-trafficking-human-beings\\_en](https://ec.europa.eu/home-affairs/policies/internal-security/organised-crime-and-human-trafficking/together-against-trafficking-human-beings_en)



The influence of the digital sector is pervasive in all aspects of life. Today, having digital skills and having personnel with ICT qualifications, is something required in all sectors of the economy, not only in ICT. A gender gap in the digital sector signifies a gap in innovation and in the future of all Digital and Knowledge Economy.

#### ***LACK OF WOMEN IN ICT***

The Information and Communication Technologies (ICT) sector is one of the most important sectors for the prospects of the European union. It is not only a sector important but a fundamental part of virtually every field of the economy and of people's everyday lives. It is therefore a reason for concern that the development of ICT in Europe is currently under pressure due to a shortage of qualified workers for employment in it. Furthermore, the increasing importance and expected rapid expansion of this field means that more people with ICT-related qualifications will be needed in the short- and medium-term.

According to the „Women in the Digital Age“ report, a study

prepared for the European Commission, in 2015, 5.8% of European workers were employed in digital jobs, compared to 5.4% in 2011. The slight growth is common for both men and women, but there was a higher growth for men, resulting in a wider gender gap: the share of men working in the sector is 313% greater than the share of women. Moreover, women who work in the digital sector tend to leave it at a greater rate than men. This is particularly visible with people who are between 30 to 44 years old, the prime working age and the stage in one's professional development.

A study was recently published by Accenture, found that 68% of female undergraduates have taken coding or computing classes, compared to 83% of male undergraduates. Women represent around 10% of one of the biggest international online coding communities - Stack Overflow. A survey carried out by the community showed that women have, on average, less coding experience and again, tend to underestimate their programming abilities compared to their male counterparts.



### ***REASONS FOR THE DIFFICULTIES IN ATTRACTING WOMEN IN ICT***

One of the main factors in girls' discouragement in choosing science and technology studies in school lies with the bias present in teaching materials such as schoolbooks and assessment forms, as well as the way teachers motivate girls and boys differently for specific subjects. Parents also tend to discourage girls from pursuing a career path in technology. Boys are usually channeled into exploratory interests and technologies, while girls are usually encouraged to explore their communication skills. The caricaturisation by the media of the occupational culture and the type of people who work there, although at odds with reality, tend to appeal more to boys.

Another very important factor in girls' demotivation for choosing scientific courses is the serious lack of female role models - visible female cases of success in this sector would reinforce the stereotype that ICT is a male-driven field. Thus, a combination of stereotypes and lack of role models seriously hampers girls' choices to pursue technology courses that would qualify them

for a career in the sector of information and communication technologies.

According to the European Parliament's Policy „Women in ICT” other factors influencing a great number of women to drop out of their ICT careers include: the ICT sector is often segregated into women's jobs and men's jobs, with the former being more related to communication and lower-paid functions, while the latter is more usually concerned with technology and better-paid jobs and poor work-life balance as ICT is perceived as a sector with harsh working conditions which include long working hours and a work-pattern that can often be very unpredictable.

The academic research clearly shows that both the educational institutions and the ICT companies need to undertake serious steps in order to change the prevailing attitudes in female students in order to attract them to pursue a career in ICT. The support of EU governments to the main players in the field of ICT will have a crucial impact on the development of the sector, which working environment needs to be a driver for change in the future labor market opportunities.



### ***Governmental measures aimed at promoting ICT among students***

In the last few years, the European Commission and the national governments have implemented many initiatives aimed at promoting STEM and increasing the number of students in those fields. A clear indication for this is the inclusion of a significant investment plan in Bulgarian Recovery and resilience plan for improving the STEM capabilities of the schools in the country.

Seen as the future way of educating young people, STEM (Science, technology, engineering, and math) could be uniquely suited to prepare young students for future success. As STEM is becoming more and more important to the future world economy, governments need to invest for adapting schools and universities to adequate STEM environment in order to the envisaged growth of STEM employment by more than 8%<sup>4</sup> by 2028.

As further best practice for governmental measures at promoting ICT among students, the sector identifies the development and establishment of

a supportive policy environment: shaping and including the use of technologies in education, ensuring that the access of women to ICT is guaranteed and comfortable.

In addition, the establishment of a dedicated national agency for supporting women in ICT is considered as a governmental measure, which will support the overcoming of the gender disbalance in the sector.

Combining such measures in a special toolkit for fighting the gender gap will establish a good base for EU governments in achieving gender balance in all fields and sectors of life and will support the equality among genders on an EU level.

### ***Incorporation of specific behavioral change methods for gender equality in ICT in educational curricula.***

#### ***Research on women's access to internet and participation in the digital sector<sup>5</sup>:***

EU's governments need to start to pay more attention to the collection and analysis of data, disaggregated by gender on

---

4

<https://yetiacademy.com/reasons-why-stem-education-is-important-in-2022/>

5

[https://www.gsma.com/latinamerica/wp-content/uploads/2018/07/Policy\\_Brief\\_W20\\_DigitalInclusion\\_2018.pdf](https://www.gsma.com/latinamerica/wp-content/uploads/2018/07/Policy_Brief_W20_DigitalInclusion_2018.pdf)

access and use of technology and work participation in ICT job positions. In order for this to be possible, PAs need to support the conduction of dedicated research concerning women's access to technology and participation in the digital sector, which to be updated regularly on every six months. Such research needs to focus on women's demand, related to the ICT sector and must comprise specific data, collected from the experience and opinion of participants, representing each gender, in order to be fully objective and to present the situation clearly. Based on the statistics, collected from the research, next steps for fighting the gender inequality in the ICT sector will be identified.

Integration of gender equality perspective solutions in national policies and plans:

1. Establishment of gender equality targets

In order to tackle the gender disbalance in the ICT sector effectively and at a good pace, governments need to adopt and include specific solutions in national policies and plans, which are designed to address women's needs and support the

use of digital technologies and tools, allowing them to participate in the digital sector. Furthermore, governments need to identify and establish gender equality targets, which to be included in topic's related strategies, policies, and plans. The inclusion of such goals in every gender related national document will ensure the support and access of women and young girls to internet services, which will enable their future participation in ICT and will roll out the opportunity to the governments for measuring the impact of these policies in future, which statistics can be used for future adaptation and improvement of their strategies for gender equality in all sectors of economy.

2. Establishment of a relationship between ICT, policy makers and young women

Young women are facing the gender disbalance problem in ICT on a daily basis. For this reason, governments must involve women into the process of overcoming the gender gap in ICT. This will ensure that the needs of women are considered and will be included in the most suitable way when developing the national strategies, having an



impact for the future ICT labour market.

As a recommendation for taking such step, the governments should consider the establishment of dedicated workgroups, consisting of policy making experts and gender equality advocates and experts to ensure that the needs of young women in ICT will be taken into account and will be included in the future national strategies and policies, related to the labour market in all sectors of the EU economy.

### ***Governmental support to women with their Work-Life Management***

One of the main reasons for women not starting a career in ICT or leaving the sector's labour market too early is the inability for balancing between work and personal life - working in ICT is considered a very time-consuming occupation, which pushes back young girls from starting a career in the field. For this reason, governments must consider developing specific measures for women between 20 and 35 years old, who have interests in ICT, but do not want to start a career in the sector, because of

other existing tasks and obligations in personal life, which cannot be neglected as family, children, etc. Inclusion of such measures will not only

support women for starting and following a career in ICT, but will clearly show them that they are considered as a very important part of the future development of ICT, which will have a positive influence on young women and will make them confident for starting a career in ICT.

### **Governmental support for providing accessibility to ICT to young women**

Even nowadays, accessing the internet and other ICT related technologies might be challenging, especially in poor and rural areas. There are different kinds of factors, which are limiting and affecting the accessibility of women to ICT- locations, not connected to the internet, operating hours of facilities, giving the opportunity to access ICT, different kinds of safety concerns, etc.

In order to fight against these limits and to support and favor women wanting to be part of ICT, governments must



consider investments in the provision of safe and easy to access public facilities, which are providing women with a free access to internet and ICT related courses. Such places can provide women with

the most needed skills and opportunities to be part of the future ICT labour market - free internet access, free online ICT courses, all types of ICT-related resources, etc.

#### **Incorporation of gamification methods into educational systems**

The process of incorporation of gaming methods into the educational system will have a positive impact on the system itself. On one hand, the gamification methods boost the engagement and collaboration between students, but on the other hand will support young girls to start feeling equal, compared to boys, when talking about ICT and will help them and encourage them to start and build up a career in the ICT sector.

To be most useful, the gamification must be incorporated and implemented in the elementary educational curricula, where the behavioral lever will be easier achieved

and with a better pace - the elementary school is considered as the place, where the believes and life perceptions of young people are being formed. This means that changing the perceptions about ICT in a younger

age will present the sector in a better way and will support and encourage young girls to pursue a career in it.

EU governments have a crucial role in the integration of gamification methods in school curricula - identifying suitable solutions and policies from other countries and implementing them in the national educational system, making the incorporation of gamification methods for fighting the ICT gender gap in schools easier. This means that public authorities must take a leading role in fighting the gender gap in ICT.

#### **Good examples/Best practices**

##### *-Inclusion of an online learning platform in school curricula*

A portal<sup>6</sup>, facilitating partner organizations and companies to work in cooperation for providing skills development

---

<sup>6</sup> The digital gender gap – Policy brief- W20



opportunities for women, unlimited in age, religion or race. Such platform is successfully implemented in Indonesia as a tool for fighting the gender gap in the ICT sector in the country - the platform works as an online co-working space, where young women can

develop their digital skills online, giving them the opportunity to gain relevant knowledge and to master different ICT skills, needed for the current and future labor market. In addition, the portal empowers young women for starting a career in ICT by connecting young ICT female talents to suitable companies from the sector, which are seeking for new employees and are part of the platform too.

#### -Creation of ICT female role models database

Promotion of such a database of female role models, working in ICT, among young women supports and encourages them to think about starting a career in the sector and clearly shows them successful examples, which reduces the fear of women for starting a career in ICT. Such practice is implemented in South Africa by creating a database of female ICT experts, role models, innovators and entrepreneurs, which has a positive impact on

breaking down social norms about women in ICT in the country and supports young females for pursuing an ICT career in future.

#### **Gender Equality Plan as basic requirement for future participation to EU projects**

The Gender Equality plan is a systematic and strategic document, which establishes priorities and concrete objectives and sets specific measures that will be implemented to improve gender equality in organizations.

Introduced as a basic requirement for participation to projects, funded under the Horizon Europe programme, GEP will have a crucial role for the organizations, wanting to be occupied in the field of Research and Development.

Sofar, applying a GEP in your organization is obligatory for three categories of legal entities:

- Public bodies (including ministries, research funding organizations, municipalities, etc.);
- Research organizations;
- Higher education establishments (both public and private).



Considering the rapid European economic development before the COVID-19 crisis and the existing gender disbalance in almost all sectors of the economy, applying a Gender Equality Plan by each legal entity, working in the field of EU projects, will make the development of company's dedicated GEP obligatory in the near future.

To be prepared for the process and in accordance to the goals of GenGapsDiGi for gender balance in the ICT sector, the basic requirements for developing GEP are listed below:

- Publicity - a formal document signed by the top management, and disseminated within the institution. It should demonstrate a commitment to gender equality, set clear goals and detailed actions and measures to achieve them;
- Dedicated resources for the design, implementation, and monitoring of GEPs; funding for specific positions such as Equality Officers or Gender Equality Teams;
- GEPs must be evidence-based and founded on sex or gender-disaggregated baseline data collected across all staff categories.
- Training and capacity-building: Actions may include developing gender competence and tackling

unconscious gender bias among staff, leaders and decision-makers, establishing working groups dedicated to specific topics, and raising awareness through workshops and communication activities.

In addition, to be most accurate and applicable, GEP must cover the following thematic areas:

- Organizational structure and balance between work and life;
- Gender balance, when it comes to leading and decision-making positions;
- Equal opportunities for career progression and gender balance in recruitment department;
- Integration of gender dimension into research and teaching content;
- Measures, protecting vulnerable groups from gender-based violence including sexual harassment.

### **Design and implementation of a Gender Equality Plan**

The Gear Tool is considered as the most suitable instrument, which provides step-by-step guidance on how to design and implement a Gender Equality plan, which suits the goals and targets of your organization. The tool identifies 4 main stages in GEP's life-cycle, which include:



- Analyzing and assessing the status quo in your organization - collection of sex-disaggregated data about staff in your organization; analyse of the data collected for identification of the gender disbalances and reasons for them;
- Planning phase - identification of the goals and tasks, which needs to be achieved through the Gender Equality plan, including identification of dedicated roadmap and measures for achieving the GEP's targets.
- Implementation - executing the steps, identified in the previous phase, forming of dedicated workgroups for development and implementation of new policies and procedures; continuous awareness-rising and capacity building efforts, which will maximize the chances for success and implementation of the GEP;
- Monitoring and evaluation of the GEP- as the plan addresses several issues at once, it leads to a complex set of measures, which needs to be monitored and updated on a regular basis, in order to be most

efficient and actual. Such a process will ensure the process of feedback collection, which will support the adaptation of the Gender Equality Plan to the changing needs, goals and activities of the organization.

Development of such a Gender Equality plan as part of the structure of each organization will have a crucial impact on the process of fighting gender disbalance in all sectors of the economy. This process will have an effect on the ICT sector too, which will encourage ICT companies to develop Gender Equality plans in support of the GenGapsDiGi goals and objectives for fighting the gender gap in ICT.

Based on the statistics and the data, disaggregated by gender in ICT companies, the sector does not pay attention to the gender gap problem- ICT companies must put additional effort in fighting the disbalance and recruiting additional female staff to the ICT labor market. The gender diversity in a team is considered as a sign and a reason for better professional results, which must encourage ICT companies to hire more females to the sector and overcome the gender disbalance in the sector once for all.





## Conclusions

ICT is the fastest growing sector of the economy that has felt a significant shortage of labor. In order to resolve this shortage both companies and governmental and educational institutions must undertake the necessary steps to promote pursuing a career in ICT among young females in order to increase the available labor pool.

To achieve that, companies and authorities need to start working together to promote career in ICT, not only by creating an environment in which many young girls can not only gain a solid STEM knowledge and skills but also an environment which fosters a desire in those girls to pursue a career ICT where to apply their STEM background.

### *The GenGapsDiGi project:*

The main objective of the project is to contribute to a much-needed change of mindset and thus transform the BG and CY environment to support and encourage girls and young women to be confident about building a career in ICT.

More information can be found on our website: [www.gengapsdigi.eu](http://www.gengapsdigi.eu)

## Partners in the project:



Cleantech Bulgaria is a business network for clean technologies, innovation, and sustainable development. The organization is working actively to introduce resource-efficient solutions leading to a shift to new business models, such as the low carbon and circular economy.



„Bulgarian Consultancy Organization “Ltd. (BCO) is the leading consulting company on the Bulgarian market over the past decade. The organization has a strong team of professionals - experts with extensive experience and expertise in the field of the management of EU funds and policies.



Cyprus University of Technology (CUT) is a state university in Cyprus with a strategic target to design and develop research activities both within the University and in cooperation with other research institutes and organizations across Cyprus and abroad.

