REPORT STUDY

"Increased participation of

women in the tech sector

[especially as developers] will boost the economy and allow for their full participation in society"

BECOMING A
WOMAN
CODER

INTRODUCTION AND FOREWORD

This report outlines the key findings from the 38 interviews of women who successfully retrained in coding/IT jobs from Finland, France, Malta and Poland. In these interviews, women were asked about their motivators, the support/help received along their path and also the obstacles they have encountered and clichés they have experienced while retraining in coding/ IT jobs.

The key findings outlined in this report will serve as the basis for the creation of a digital tool kit made up of different training tools and documents aimed at conceiving specific awareness and tackle gender stereotypes and specific stereotypes of the profession of developers to foster inclusion of women. Considering that a previous studies[1] reveals that "European employers are subject to a talent shortage in tech [especially with developers]: they have large numbers of vacancies and not enough candidates to fill them", it is a significant challenge to orientate unemployed and/or low-qualified women and women in precarious employment, to retrain toward the coding professions.

Finance, sport, human resources, health, linguistic, hospitality, insurance, management, sales, fashion, social help, telecommunication, law, gastronomy, teaching, engineering, floristry… The 38 interviews of women who successfully retrained in coding/IT jobs from Finland, France, Malta, and Poland really highlight a wide range of business fields. Which proves there are no hard rules for retraining in coding/ IT jobs.

[1] Cedefop (2015). Skill shortages and gaps in European enterprises: striking a balance between vocational education and training and the labour market. Luxembourg: Publications Office. Cedefop reference series; No 102. http://dx.doi.org/10.2801/042499
The Korn Ferry Global Talent Crunch report - Korn Ferry Institute. (2018)
Indeed, Hiring Lab (2015) Opportunities & Challenges for European Tech Employers

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MAIN DRIVERS FOR RETRAINING

The main drivers described by women who successfully retrained in coding/IT jobs interviewed can be split into two broad categories: professional drivers, and personal drivers.

PROFESSIONAL DRIVERS

Many women mentioned first and foremost several professional drivers that have led them to think about retraining in coding/ IT jobs.

Unstable job environment

"I worked left and right and never found a long-term job".

Some of them couldn't find a stable job, they were used to work in several companies, jumping from a short-term contract to another one, working left and right without finding any long-term contract to be able to stay more time at the same position.

A job that doesn't fit

"I figured out that it wasn't the job I wanted to do".

Some of the women interviewed had had enough of their jobs. They were getting intellectually bored and didn't like it anymore. Some of them were so bored that they even fell into depression.

Some others realized at the end of their studies that they were in the wrong sector; they realized their mistake only once they faced it.

Career evolution perspective

"I didn't want to do the same things all my life".

Some women reported the need for evolution in their career. After a long time at the same position they wanted more: an evolution of their status, a condition improvement... Others reported that the monotonous side of their job made them think about retraining.

Seeking personal potential

"I was still looking for myself".

Other women that did not reach a high level of education, were lost in the job market, and still didn't know what to do. Without any help or proper career guidance, they were like abandoned to their fate by the system.

PERSONAL DRIVERS

Medical reasons

"I couldn't continue my work for health reasons".

One driver that stood out in some interviews was medical problems. Due to medical reasons, some women were forced to turn away from their path. One example was the need for a job that could be done while seated due to back problems. Another one was the high level of stress caused by the previous job. Other health issues were pointed out.

Finally, the coding / IT profession can be a perfect opportunity for people with different abilities. One of the interviewees has a severe physical disability whereby most of her body is paralysed limiting her motion. However, she can work on a computer using her mouth.

Family life

"I had a child and with my partner we decided to move to another city".

A move, a pregnancy, a baby, a country change, family circumstances can be a main driver in encouraging a person towards retraining.

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MAIN REASONS FOR TAKING THE PLUNGE

After learning which elements gave these women the impulse to think about retraining, let's learn why they decided to take the plunge and finally chose to retrain in coding/IT. The interviewees mentioned various factors that motivated them to pursue their venture into this retraining.

ATTRACTION FOR THE PROFESSION

It's an environment that I like

"I had an appetite for computers: I was always at ease with any software, computer...".

Most interviewed women spoke about their real interest in the IT field. They were comfortable with computers and new technologies. It is a sector that intrigued them. Some wanted to learn what coding is about and what kind of skills are needed in this profession, others proudly raised their geek side which lead them to this retraining.

The interviews also brought to light the logical steps that followed the initial interest. Indeed, many of them decided to try the job before retraining: self-learning, tests, free online training courses, workshops... Discovering that new field and experimenting on their own convinced them to take the plunge.

I didn't want to regret anything

"What if I didn't do it? I didn't want to regret my decision"

Some women really wanted to try it and after they weighed the pros and the cons decided to take the plunge not to regret anything.

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PROFESSION OPPORTUNITIES

It's a job where there is lot of recruitment

"I wanted to work where there were opportunities, where I could evolve".

The IT field is a promising field according to many women that have been interviewed. As IT is a job under constant pressure for more development and innovation, there is enough work available for skilled people to find a job easily. Some of the interviewees mentioned the IT boom of the 2000's.

It's a job where there are lots of possibilities

"You can do many different things, and never get bored".

Some women pointed out the fact that a developer/coder can work on many different projects. This is not a monotonous job and is hence satisfying as it provides diversity to the employee.

There is a good pace of work

"Thanks to the flexibility, the work can be done in any place, at any time".

Indeed, a couple of women have highlighted the easy pace of work that would be a necessity in combination with a family life. Some of them were motivated mostly by the fact that they could create their own work schedule, giving them the possibility to reach a most desired work-life balance.

It's well paid

"One the reasons were definitely incomes".

The financial aspect, the good salary and better conditions also guided some women to choose a retraining in coding/IT. They were mostly motivated by the fact that they could earn more money than they were getting from their actual low-level jobs.

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ADVICE

Relatives/Friends/Spouse with an IT Background

"I was brought to the IT industry and coding by people around who were already in it".

Many of the interviewees were guided towards an IT/coding profession by someone who believed in them, who pushed them. A family member, a friend, acquaintances that already worked in that field. Like that, they had the support of a mentor who advised them, shared information with them and was a point of reference and a discussion partner on work related issues. They felt encouraged, held by the hand.

Also, it is important to notice that many women interviewed came to consider this profession because their boyfriend, husband or spouse works as a developer, it shows here the important of a close support behind them.

State organisations / employment centres

"At the state employment agency, there was a strong initiative to go into these professions".

Some other women were advised by their state employment counsellor that spoke to them about a retraining in coding/IT profession.

PREVIOUS SITUATION

I was very bored in my work / I needed a change

"I needed something that activates my brain more".

Interviews, once more, revealed a serious need of intellectual challenges. Women needed more, they felt like their development had stopped in their previous job.

They also pointed out the fact that there were no perspectives of career evolution, no opportunity for them to climb the ladder and get more responsibilities. That's why, they weren't satisfied with their career options and needed to find something different.

I was jobless / I needed a job

"The management decided to say goodbye to me. I had to find another job".

The last reason in pushing women to take the plunge was losing their job. Some of these women were either job less or had got fired from their previous job and they needed to find something as quickly as possible.

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Main reactions to the announcement of the retraining

Happiness

"I got very good feedback. My family and friends were excited, cheering".

The reaction that dominated mostly in interviews was happiness. Indeed, most of the time people, family, friends, or colleagues reacted positively and even with admiration in some cases. Some people thought it was a great and brave choice to be able to take the decision to retrain. People were excited to see these women feeling good about their choices.

Support / Encouragement

"My family has always supported me in my decisions and respected my opinion".

The second dominating reaction was one of encouragement. After announcing their retraining plans, our interviewees felt a great support around them. They were helped a lot in progressing with their idea of changing of industry.

Surprise

"My entourage was astonished because the orientation changed a lot, and some were very surprised".

Some acquaintance of our interviewees was caught by surprise because, according to them, the IT field didn't always fit the personality of the woman retraining. In certain occasions, there was a big gap between the woman's previous field of work and the IT/coding profession.

Concern / Worry

"People were worrying that I was doing something stupid".

Some acquaintances were concerned about the idea of the women quitting secure jobs for something brand new that they would need to start studying from scratch for. They thought it was a huge risk that would not necessarily pay after the retraining.

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Disagreement

"My father wasn't particularly in agreement, it's a boy's job he said".

A few of the interviewed women had to face bad reactions. Some people around them thought IT/coding was so far from their everyday life that those women wouldn't succeed in the retraining. Others were deeply influenced by the profession's clichés: it's a boy's job, it's very technical, you must be good with mathematics…

No reaction

"There wasn't really any reaction: "we'll see"".

Some women didn't get any vivid reaction. People were just waiting to see what would happen and let the interviewees continue their retraining path without trying to influence them either positively or negatively.

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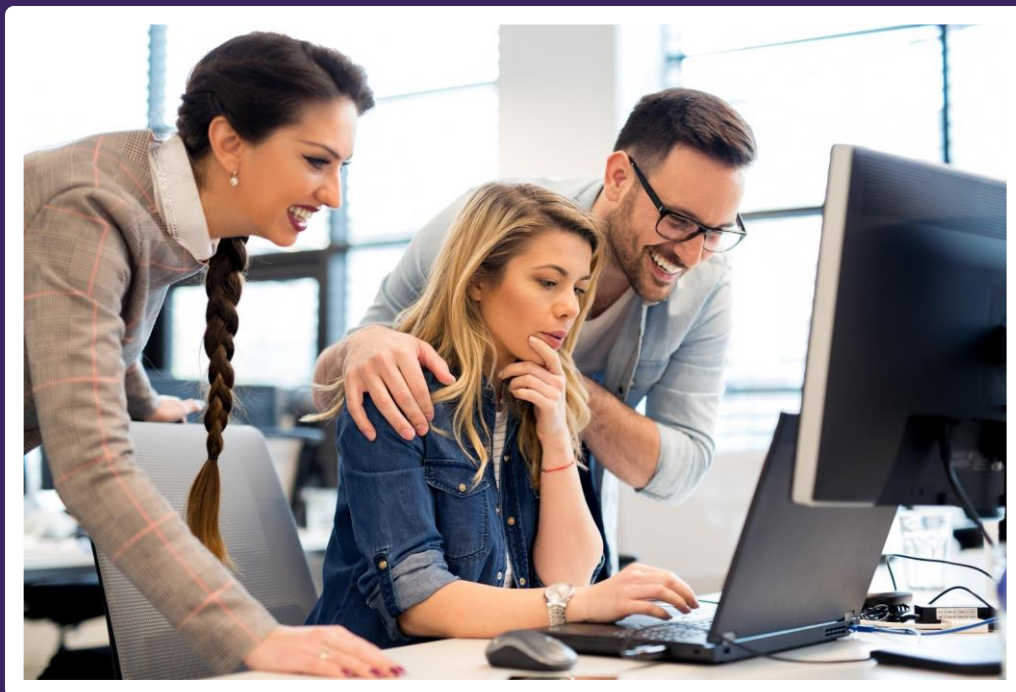
THE IMPORTANCE OF SUPPORT, WHO WAS HELPFUL AND HOW?

Family, spouse, and friends

"I had my husband: he took care of our home, helped with the children, so he helped me a lot".

The most commonly mentioned sources of support and encouragement were family and friends. Whether in the form of practical help (taking care of children, performing domestic duties, planning, and making arrangements for the family…), psychological or financial support, all the interviewees insisted on how powerful this had been in their retraining.

The support from their boyfriend, husband or spouse is largely mentioned and moreover if the latest is already working as a developer a close support in life but also a good help for advices and work.

Support from friends was also very important for our interviewees. Why is friends' encouragement so important? Because they give you more confidence and it feels good when people around you, offer their help, send a text message and make you understand that they are there for you whenever you need them.

Training Centres / Course Mates

"We were all women, and although of different ages, it was quite easy to understand each other; they pushed me a lot, they gave me a lot of self-confidence, it felt good, it was cool.".

Support from their training centres was also a strong motivator for several of the interviewed women. Support came in the form of a teacher who believed in them, their ability to practice, test ideas and perform professionally but it came also from an environment of positive thinking, idea sharing , and enthusiasm from classmates: great cohesion, mutual help, comradeship …

Advisory Bodies

"I think it was my counsellor; she had made a presentation that really motivated us by saying no matter what you wanted to do as a profession, it's doable".

Counsellors in employment centres and state organisations have a very important role to play. Some women highlighted the fact they gave them motivation, self-confidence, and energy to take the plunge in retraining. Their presentation of the profession, advice, listening can make a big difference in shaping the future of the person seeking guidance from them.

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Professional: colleagues and network

"Women code-community: They have given me positive support and I feel like I can do this, and even though this is hard I feel like I am not alone".

Beyond family and friends, many interviewees found support among other communities: an online community of bloggers, an IT community, freelancer peers who gave advice. To these respondents, it was extremely valuable to be able to talk to people when they did not know how things were going, or when they were looking for advice or answers their family or friends could not offer. This kind of support could also come from a business collaborator, the company's team.

Several respondents insisted on how beneficial it had been to share their ideas: they received feedback, pushed their ideas further, and gained confidence.

No support at all

"When it comes to financial or mental help or support, no one helped me, I could only count on me".

A few interviewees answered that they got no support at all. Those who did not receive this support were very clear on how difficult the retraining path had been for them: financially, emotionally and for their rhythm of life.

One subtle but important distinction to highlight at this point is the fact that support does not eliminate doubts. A few women claimed that although their family and friends were very supportive, they would still sometimes show concern and doubts with respect to their decision to retrain. This was especially true for women that were turning down high-paying jobs or stable careers to retrain in a new field instead, especially in the current context of economic difficulties.

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THE SPECIFIC ROLE OF PROFESSIONALS
THEIR ROLE AND SUPPORT

Professional help is very important for retraining candidates throughout the whole process. Indeed, professionals are supposed to guide and help women to take the right decisions, move in the correct direction and to facilitate their retraining path. Employment counsellors are also very important before the retraining starts, to guide women into learning about the benefits of retraining in coding jobs and choose this as their future profession.

Training centres

"I was just lucky to meet very nice people in the training centre. People who not only took the money for conducting trainings, but also supported us".

Some of the interviewees claimed that help and support mostly came from training centres. Thanks to very helpful and listening teachers that could guide them all along their training path, motivating them to work, explaining hard concepts until they understood them.

Employment centres / State organisations

"I had the help of my counsellor, she was asking about me, she helped me a lot, she financed a part of my training. I had a lot of support from her".

Those organisations are very important before and all along the retraining. Indeed, counsellors have to be very present for the retraining **women. Many interviewees are very grateful to their counsellors because, thanks to** their guidance they could access financial help offered by government. Some others took time to look at the different possibilities the women could follow for retraining, like companies that provided courses on a part-time basis. The counsellor's follow up also seemed very important to assess the progress that was being achieved.

IT professionals / Professional networks

"I had a great mentor. He took the time to guide me through coding concepts and always had time to answer my questions".

"One person I know through the online community has been an important mentor: he helped me, gave me advice and guided me along my retraining".

Help and advice from IT professionals and network are very important and needed for our interviewees. Easier integration, guided choices, patience were the strong qualities of the mentors according to the feedback obtained.

No professional help

"I did not receive a study grant".

Many interviews highlighted the fact that women didn't get any help at all, especially coming from employment counsellors or state organisations. Indeed, what stands out in these answers is that counsellors didn't really know how to speak about coding profession due to their lack of knowledge in that field. It seems that some of them didn't even think about suggesting a woman to retrain in coding/IT due to the perceived idea that this profession is mostly for men.

Other interviews pointed out the fact that some women didn't receive financial help, while others discovered the availability of study grants only after the retraining was finished.

What is interesting to note at this point is the importance of the interviewee's country's ecosystem around IT/coding retraining: beyond the motivators that the interviews brought to light, the combination of economic and social environment, the overall cultural mindset around IT/coding retraining as well as the level of support from the government and advisory bodies, seemed to play a very important role in the interviewees' motivation to choose IT/coding for a professions, and their subsequent level of success.
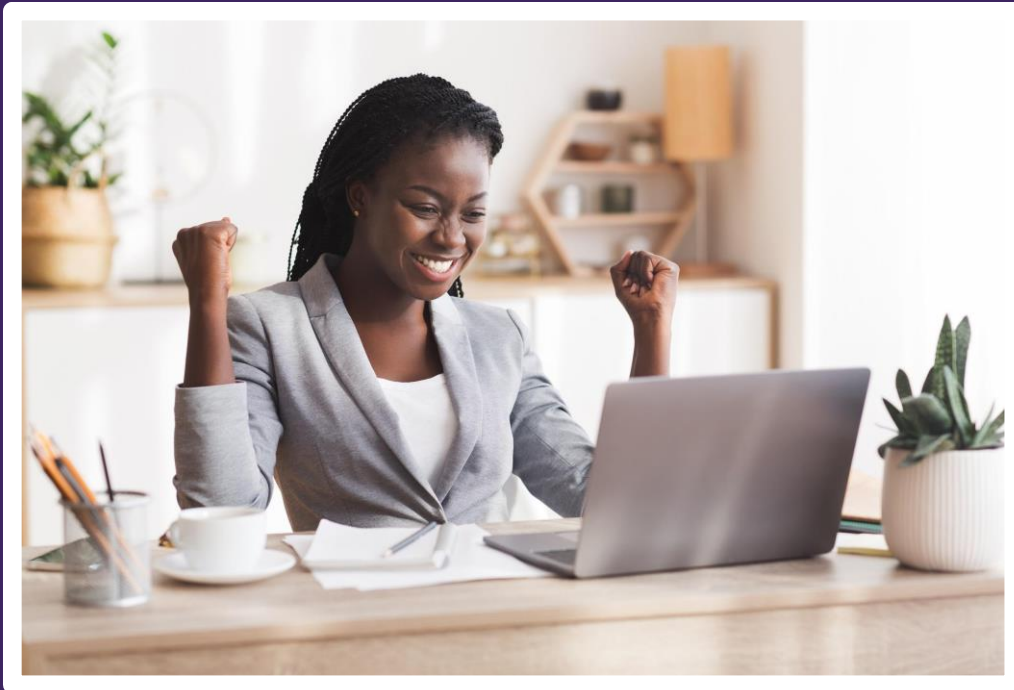
HOW DO THESE WOMEN DEFINE AND DEAL WITH SUCCESS AND FAILURE?

Many of the respondents highlighted the emotional rollercoasters they had been through while retraining, especially in the beginning. Their definitions and ways of dealing with good and bad moments provided much food for thought and ideas that can be used for this project's deliverables.

Success can be motivational, but it also brings along the pressure not to lose what has been gained. Failure can be taken personally, success and recognition can be energizing, stress can be a stimulus.

GREAT MOMENTS

Sense of pride

"When I passed the exams then I felt really proud of myself as I knew it would open doors for me and give me an opportunity to do what I wanted to do".

According to the interviewees, there were numerous moments of pride during the retraining phase. They were all very important because this sense of pride maintained their level of motivation high and gave them the hope and energy needed to continue with the hard work. Understanding a lesson, being able to help others, delivering a good presentation, obtaining good feedback from the teachers… each of these moments are crucial in any retraining path. They should be given special attention by professionals, moments to highlight and celebrate.

Importance of achievement

"The biggest successes are all the individual and collective projects that went very well".

The importance of achievement also takes an important place in the testimonies. Receiving good feedback after a project presentation, succeeding in a test, passing the final degree… the success of these steps was really important to our respondents. It gave them a concrete feedback, like the light at the end of the tunnel proving they were on the right track. Making every success a big moment is important and crucial to validate and to ensure a good retraining path.

It's also possible to go further and to say that concretization is a key success for a retraining support role and that it should be a specific point, brought forward and emphasized with employment counsellors.

The last success factor mentioned, and probably the most significant, is the fact that many women easily found a job after their retraining, which was after all the goal of every woman.

Importance of support

"Knowing that I had someone at home who could help me was a plus compared to others".

Another key to success pointed out is support, which is necessary to keep motivated all along the retraining especially in hard moments. Family, partners, and friends held an important place for all women who decided to retrain in the coding profession.

Being part of a team was also pointed out by many respondents as a strength, to deal with failure, and celebrate success. Indeed, the training environment is very important and the more united the participants are, the better they help and support one another. That's where training centres have their role to play, in creating a healthy environment where course participants are encouraged to work hard and achieve both on a personal level and as a team by empowering each other.

Teachers / training centres

"At our training centre, you got a badge for each completed course. And these badges made me feel I could do something"

Finally, the importance of pedagogy is also crucial. A good teacher can make the difference in a retraining. Teachers/tutors have to be supportive, to give energy to the group. Their teaching methods are essential, they should give the right consideration to each student, they should not be childish because they are facing adult students, they should be comprehensive and patient. These were good qualities observed by many respondents.

BAD MOMENTS

Stress and pressure

"We put a bit of pressure on each other; I did my retraining course when I was 34 years old, what if I couldn't reach the goal of my training?".

Retraining is a big challenge. Some women had to quit a stable and secure job towards a more uncertain future. With this situation goes a lot of pressure, from themselves but also from family or friends around them. Questioning themselves about their decision added stress and pressure on their shoulders. And finally, discouragement, sometimes, when failing in a test made them fear the future.

Sometimes, the success of one of their training mates made them face their own failure. It can be hard to see someone else succeeding in something that seems so hard in your eyes. In these moments, the stress and the pressure can be both demotivating and challenging. The way you let such situations define your attitude depends pretty much on your character.

Lack of self-confidence

"Sometimes I doubt myself too much and think I am not good enough".

Other hard moments are brought along when discouraging and questioning oneself. Professional self-esteem can be affected when changing professional field and feeling vulnerable. It's not that easy to start all over again. Doubting, being afraid not to succeed, being afraid not to understand.

The support factor has a very important role to play here, by means of a teacher/tutor, an employment counsellor or even family and friends. Again, the follow up of a professional such as teachers and employment counsellors is crucial in those moments for the woman to stay in check and not to throw in the towel on their decision.

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Hard beginnings

"The training was a roller coaster ride. At the beginning, it was complicated because it was an environment that I didn't know at all".

Many of the respondents signalled some hard beginnings. Indeed, the beginning is complicated: a new environment, new language, new people. A retraining is a real discovery, it is hard to start from zero. The assimilation of very technical information can make women afraid. Some of the respondents admitted that they were not well informed enough about the needed amount of work, they didn't realize it was such an investment of work and time.

The beginning is a key phase in the follow up plan of both employment counsellors and teachers. It is a hard transition for the trainee one that needs to be monitored closely to avoid feelings of despair, hopelessness, discouragement or even a retraining cancellation from the end of the trainee.

Hard rhythm

"The small moment of discouragement is that the rhythm is very sustained: it's complicated at the end of the day. I didn't have too much time to breathe".

Most of the time, retraining session are short intensive sessions. So, there is a lot to learn in a short time, bringing along a very hard rhythm of work. As said before, a retraining is an investment, and women need to be aware of the rhythm and prepared for work that needs to be done, not to give up their retraining. Again, employment counsellors have their role to play in informing them about the difficulties they could face. Teachers/Tutors can also be of help by using good listening skills, showing their interest in the trainee's ideas and concerns, and motivating them to work hard and achieve.

Facing sexism

"I've felt that my gender has been seen as a problem. It has always been subtle. No-one has ever told me they see me as less professional because of my gender, but they've communicated it otherwise."

Few women reported the fact they had to face sexism. IT/Coding is a profession that is dominated by men, and the clichés that say it is a male job can surface sometimes. The more women there will be in this field, the less this cliché will stand.

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WHERE TO FIND MOTIVATION?

As we have seen before, there are complicated moments in a coding retraining. What keeps respondents motivated, what gives them the energy to continue and to go through these difficulties?

Self-motivation

"My motivation has been my determination to learn and succeed. I treated it as a challenge".

From the interviews conducted, it transpired that the main source of motivation was indeed self-motivation. Some women chose to count on their personal qualities: patience and trust, working hard to go beyond, courage to do better, resilience, determination. Others just had to think of their situation in the previous job or their past to motivate themselves to go on and continue working hard because they didn't want to go through that kind of situation again. They could count on their strong personality and their unfailing motivation to continue and end this retraining successfully.

Interest in IT / coding

"After starting my retraining, I always wanted to learn more and more".

Some women were really determined to be coders and didn't allow themselves any other option; this shows a strong character and the power of willingness. The degree to which they liked their new field of work was a real advantage for them to keep working and to go through more complicated moments to finally achieve their professional goal.

Family, spouse, friends, and network

"My main motivator was my partner who always encouraged me throughout the first course, explaining that I needed time to learn and understand everything".

Many of the interviewees relied on encouragement or nudges from family, friends, and mentors, to get back up and continue working on their retraining when failing or feeling discouraged. The help and support they were offered gave them the strength and the courage to go on and finish the retraining.

Talking with people who lived the same experiences and went through the same path can also be of help. Being part of a professional network would be very useful here; indeed, it is important to feel you are not the only one who goes through these difficulties. The network can also provide you with solutions that help you to go on.

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Training centres

"I found the motivation in the training tutor, he motivated me".

As we said earlier training teachers held a key role in the respondents' level of motivation. Trainers' presence, their help and their listening skills, their kindness and their comprehension were important to face difficulties and overcome them.

Training colleagues

"I found the motivation in my group; we were very united; we didn't want to leave anyone out, there was a great cohesion".

Training comradeship is very important to keep motivation high within the group. If the class is united, the students can motivate, support, and empower each other. After all, members of the same class are living the same experiences together; this is a perfect time to create a real team spirit among them, which can be one of their strengths all along their route.

Recognition and success

"Recognition and getting good feedback have helped a lot!".

The last thing mentioned in this category that had helped some interviewees, was getting good feedback. Recognition and success are primordial, knowing you did good and you are on the good way to success is motivating. It helps reassuring you and helps you get over feelings of discouragement and fear.

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CLICHÉS HINDERING WOMEN FROM RETRAINING IN A CODING PROFESSION & PRECONCEIVED IDEAS SWEPT AWAY AS THEY MOVED AHEAD IN THEIR NEW JOB

There are strong clichés around the IT field and coding profession, quite widely and universally shared among the different countries taking part in this research: a coder is usually a man, a geek who works alone, who knows everything about computers, who is very good in mathematics. The interviewees had common thoughts around the clichés that hindered women from retraining in coding profession and preconceived ideas swept away as they moved ahead in their new job

It's a male's job

"I think IT is still seen as a male dominated sector and many are scared to venture in such sector as they fear they will be discriminated or not as good on the job as males"

Cliché number one that is largely highlighted in interviews is the gender associated to coding profession and IT field in general. This cliché tends to make women think they will not be accepted in that field or that is going to be very hard to be integrated in a technical company. It's a man's job, that is to say that women are not good enough to do it, they do not have the ability to understand how it works. This cliché can block some women from retraining in coding profession.

But, when our interviewees experienced their first job as coders, this cliché, most of the time was erased. Some even found it liberating to feel on the same scale as a man. Indeed, it is a masculine universe, but only because many men work in it, not because females are not able to handle the core tasks. However, there are some companies that still have a little macho culture.

The lack of women models in coding jobs is also pointed out by the interviews. It would be useful for women to be able to rely on a feminine model to be able to accept that coding has no gender. Some also pointed out the fact that in job vacancy adverts, companies often use the male gender term in the description, which can be daunting for some females wishing to apply for the job.

It's a geek's job

"A Coder is a nerd boy who keeps pounding code night after night, drinking energy juice as the green numbers keep running on a black background."

The geek or nerd character also stood out in interviews. The character wearing a hoodie, shy, not very sociable, who is living with his computer, very smart… This character is always described as a clever man and is supposed to represent coding jobs.

Interviewees, through their first job, had the chance to prove this is not the only way to portray a coder. In fact, although there truly were some geek coders, there were also multiple kind of different personalities, which were very far from being geeks.

You need to have a scientific profile

"One should be terribly mathematically gifted or into mathematical science subjects to be really good at coding"

Another cliché of the coding profession is that you need to have a very scientific profile to work in that field. In reality, what is necessary is to have a good logical mind.

Mathematics are also often associated with a gift for men and supposed to prove women they aren't made for coding jobs.

Respondents confirmed it is not so necessary to be mathematically gifted, and that you can be a coder without having impressive math skills.

You have to know everything about computers

"You had to know everything about computers, whereas computer science has nothing to do with that job, on top of that"

Another widely spread cliché about coders is that you must know everything about computers. That means you should know how to build a computer, how it works, etc. whereas coding isn't that technical with relation to computer architecture.

Computer language is gibberish

"A computer language is gibberish, it's machine language, it's something very square"

Computer language is incomprehensible. This is very hard to understand, it's gibberish. Coding is very hard and difficult. This reputation really can persuade women not to take the plunge in a retraining in coding jobs. It gives a sense of fear not to succeed.

Coders work alone

"The programmer only sits in front of the computer and works alone, but in fact the work of a programmer is very often a teamwork"

Finally, coders have the reputation to work alone, they are imagined as solitary people sitting in front of their computer as their only colleague. The feedback from our interviews proved the opposite; indeed, it is very often a teamwork, a real collaboration between colleagues, and coders aren't isolated.

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WHAT PUSHED WOMEN TO BECOME PART OF THE 6% WOMEN DEVELOPERS IN THE WORLD (AND 16% WOMEN EMPLOYED IN ITC IN EU)

BECOMING A **WOMAN CODER**

For a lot of respondents, it was not easy to answer this question. This might also be because they do not feel they a part of a minority, which would be a sign of a complete integration.

To prove women's capabilities and increase representation

"It creates such a lack of representation for women who would like to enter the industry. It would definitely be in everyone's interest to have more diversity and greater representation in the industry".

Some women really wanted to increase that figure and to make sure of it. It was important for them to show other women that it is possible, as a woman, to be a coder. Women have just as many capabilities as men, it's an equality matter.

To bring another vision

"In some companies, men want it to be a little more feminized, women bring something else, another vision, another organization".

Other women have experienced that it was important to bring a female vision to the job. The hiring companies were convinced women could bring their own point of view on board, a new one. Some interviewees also declared that men were wishing for an influx of women in the profession because they needed that fresh and feminized vision.

To challenge themselves

"I think I wanted to prove to myself that not only a guy can program".

For some respondents, it was seen as a challenge. They decided to take up this challenge because of curiosity and to prove that women could also be coders. Again, coding has no gender. One of the respondents also declared that she didn't set herself any limit!

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WHAT BARRIERS DID THEY FACE AND HOW DID THEY DEFEAT THEM?

A surprising proportion of the interviewees did not feel they had faced any barriers in their coding retraining.

Gender Discrimination

"Sometimes you have to become part of all male teams and some of them will be happy to make a few shallow remarks, about your gender".

The stereotypes requiring you to be this or that, sometimes lead to gender discrimination. Some of the interviewed women had to get around their employers' wrong beliefs about women, some of which were difficult obstacles to jump over. Sometimes they were considered as less competent than a man having exactly the same professional qualifications. Here we are talking again about the preconception that women are not well suited for programming/coding as men are. Some of our respondents claimed that even some other women said that such a career wasn't for them because it's not a feminine career!

How to defeat it?

Our respondents offered two way to defeat this barrier. The first one is working on their personality, their character. Women need, more than ever, to have a hard skin at work, they need to have a firm grip and be assertive in their position. Indeed, in order not to be discouraged, they have to work on their emotional and psychological strengths and to become as strong as they could be to manage such complicated situations.

Another key to defeating these situations given by the interviewees is to verbalize them. Women need to talk about such discriminative remarks to stop them as soon as possible, they have to bring them up. The more women will speak about these situations, the more they will be brought to light, the faster they will be stopped.

Lack of female presence on the field

"I think that because men are the majority, many organisations do not have developed solutions that could encourage women."

Lack of representation and misrepresentation is one major barrier, that may lead to both implicit and explicit discrimination. Indeed, the lack of woman representation can influence employment

counsellors, or job advisory bodies into not directing Women to retrain as coders They do not think about a woman as a coder, so they don't orient them towards this job. The implicit discrimination would come directly from women. They can have the fear to be the only woman in a team, and it can dissuade them from retraining in coding profession.

How to defeat it?

We just need more examples of women coders. They have to be brought under the spotlight. We need to change people's minds, making them think also of woman when thinking of a coder. Organizations, advisory bodies, associations, networks, employment centres have definitely their role to play in this part. It is important that they introduce more and more women to this field and show them that this is something for them, we need to encourage more women in this career because this type of job is for both men and women. In order to do that, it is necessary to sensitize these entities about the subject, to make them change their mind and understand that a woman can be oriented towards coding jobs. The option of suggesting a coding retraining to a woman must be incorporated in their concept of work.

Lack of self-confidence

"The main obstacle is the woman herself and the idea some women have of themselves".

Some interviewees also insisted on the self-imposed barriers in women, who tend to downplay their achievements and underrate their performance. They can be their own barrier due to lack of self-confidence, by minimizing their work results and hence their abilities. They can be submerged by their own fears. Such feelings can dissuade them from retraining in coding jobs, or even give up the retraining in any other area. A little failure in a retraining path can ruin it all and can have big impact.

How to defeat it?

Applying emotional intelligence to how women digest failure and take action is very important. Again, women must be strong, determined, and sure of their abilities. Here comes again the importance of their acquaintances: they need support, encouragement, reassurance from other people. Family, friends, colleagues, professional network. Everybody can help and destroy that barrier. State organisations, employment counsellors, associations can set up a close follow-up before and throughout the retraining path to ensure that lack of self-confidence isn't a reason for a woman to give up.

Family life and social pressure

"Social pressure on women is very tangible. Having to juggle between work and personal life is the biggest obstacle and one has to find a balance between the two and do both in the best way possible."

Sometimes family can be a breaking factor for retraining. Some women realized they were forced into giving up on their professional dreams because they were expected to take care of their household. This is again both an implicit and explicit barrier. The social pressure can be hard on women, and moreover, some women tend to succumb under the weight of anticipated difficulties. Women with children, during their retraining, have a double work, and that could be discouraging.

How to defeat it?

Communication is key. Women need to communicate with their family, their partner. They must anticipate and discuss the issues that could come along the retraining path. They must try and reach a compromise within the household. Women need to speak up and alert their family when difficulties arise. On the other hand, the other members of the family should be attentive to capture signals of stress and hard moments in real time. Sometimes women can get a bit overwhelmed at work or in personal life. You don't always manage to draw a line between the two. That's where support of the family or friends makes sense.

As a conclusion to this part, we can say that even though most of the interviewed women faced one or more of these barriers, they were all strong enough to overcome them and continue working to achieve their final goal.

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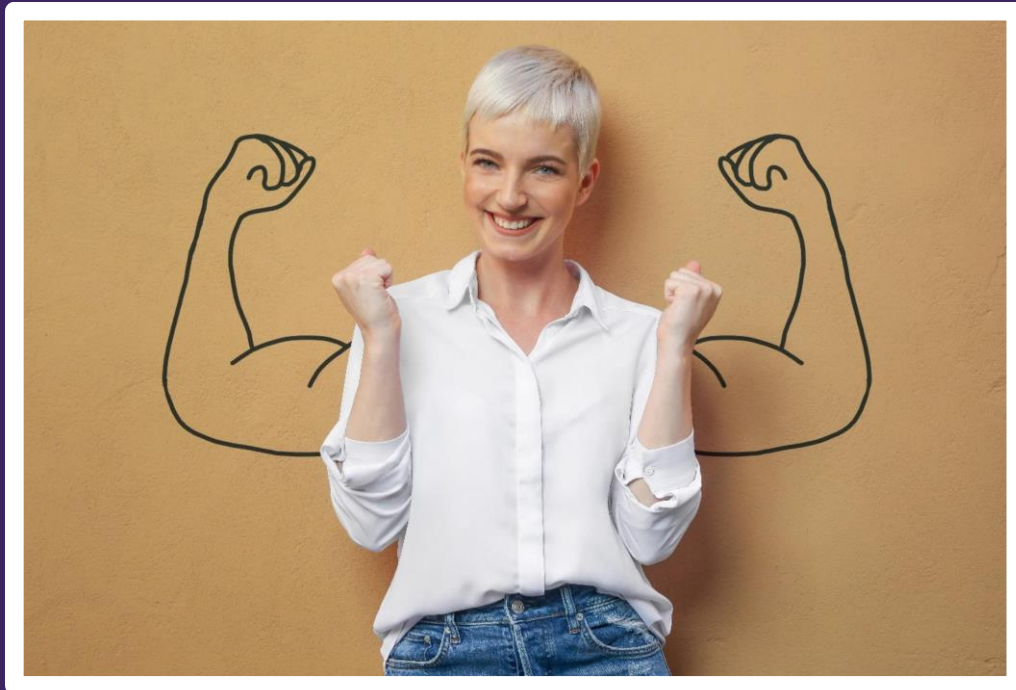
WHAT DOES THE RETRAINING BRING IN THEIR LIFE?

Answers to this topic can be divided in two parts: psychological benefits and more material benefits.

PSYCHOLOGICAL BENEFITS

Feeling of well being

"This job provides me serenity, calmness and in general more job satisfaction".

Some of our interviewees were looking for intellectual challenges and they found them. Others were simply more happy, less worried, and generally felt more peaceful.

The personal well-being is, by far, the benefit that has been the most named by interviewees. Now that they have a job that stimulates them and that they are passionate about, they felt they have developed themselves professionally. Some felt they had gained more autonomy, now they were more independent. The change in field of work after the retraining delivered them a lot of satisfaction, they showed themselves and everyone else that they could do it. It definitely gave them a sense of accomplishment and relief.

More self-confidence

"This new career gave me confidence, self-esteem and awareness of my skills".

Now they have finished their retraining, and, most of the time, found a job, respondents confirmed a visible gain of self-confidence. The pride from their own success made them stronger and more aware of their own skills. They also won a better self-esteem. The success achieved made them realise what they had been through and the amount of work they had done, to reach that level.

A better rhythm of life

"It's a flexible job. I have really flexible working hours and place of work. Work is not tied to time and place"

Most of the interviewees claimed that their new job offered them a good work-life balance enabling them to give their best in both areas. This comes from the fact that most IT/development employers offer flexible working schedules and teleworking. The flexibility of the job allows them to organize their timetables based on the needs of their work and their family, hence allowing for a more peaceful and easy life.

MATERIAL BENEFITS

A better salary levels

"Financially, it was definitely a positive change. I have finally been able to leave my parents' home, I live alone, I no longer have any money worries".

A lot of respondents highlighted the fact that their new job offers very good salary, and even for beginners. Some interviewees declared it was their highest salary ever. Some even added they do not panic at the end of the month anymore; they are more financially stable.

Sometimes, the lack of women in coding jobs and the fact companies are looking for those women, made them have a better salary than men. They also added that they can climb the salary ladder very quickly in this field of work. With salary increase being a tangible benefit, they feel more at ease and less stressed in their general life.

Better career evolution prospective

"I am offered the opportunity to move up the ladder, and therefore the salary".

As a result of what they worked for, many women answered they now had more opportunity to get offered better jobs and to develop professionally.

Higher job security

"Now I have a stable job. And I'm sure to find another one if needed".

As this is a field where there is a lot of recruitment, some women finally answered they felt more secure now. They have a more stable job and they know that if they wished to find a new one it would not be so difficult and that companies are sometimes waiting for them.

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RECOMMENDATIONS TO A WOMAN WHO IS CONSIDERING RETRAINING IN CODING PROFESSION.

Beyond some very pragmatic pieces of retraining advice (such as find investment, inform yourself about training centres, have a talk with a counsellor…), recommendations given by the interviewees had varied themes:

Try it before launching

"You can start slowly by listening to podcasts, following tutorials on YouTube, follow online courses… Like that, you'll be able to check if you really like it"

Many interviewees advised to try coding before launching in a retraining. There exist many free training courses, online courses, tests, Open classrooms, MOOCs, tutorials, workshops that can be done in order to confirm whether one likes this profession or not. These tools can also help to determine the job's difficulties. Like that, you get familiarized with coding before taking the plunge and really retrain in the coding profession. Once you obtain an overview of the profession and the skills you need to obtain, you are better placed to understand what route to follow to be successful.

Do not do this alone

"Find someone who can be a mentor, even if it is not one person, there are communities on the Internet that can help".

It is important to be able to ask for and seek help. Many of the interviewees insisted on what a great time it was to retrain, thanks to a mentor, peer group, a strong network, internet communities, help provided by state organisations and other associations. The great advantage is that they knew what they are talking about and could offer proper guidance. It is easy to get lost when you are alone and without any help things can get far more difficult.

Be prepared, it's an investment

"If you want something, you can achieve it, you just have to put a lot of work into it".

As many of the interviewees pointed out, a retraining venture is mostly a lot of hard work. It can be a tough job; It can happen to have sleepless nights. It's a long game and everybody needs to be prepared to be invested in it. It is important to be realistic in the expectations around the amount of work, but also to have the patience required when retraining in a new field. A retraining in the coding profession shouldn't be taken lightly and it is important to be prepared. The persistence, the hard work, some sacrifices, and the investment will lead to a successful achievement and it's worth it!

Believe in yourself and surround yourself with people who believe in you too

"Be self-confident, believe in yourself. You might need someone to help you keep your motivation, because you may not be able to do it yourself".

This recommendation came up in several interviews: finding your path and following it, not comparing yourself to others, believing in yourself. In addition to this, many insisted on the importance of selecting the people you seek support from and choosing to be surrounded only by those who understand you, encourage you and empower you. Steer away from people with negative attitudes who might pull you down when in time of crisis. Family and friends hold an important place in a retraining path to keep motivation.

Go for it

"Feel free to join. There is only something to win. In industry and technology, the sky is the limit to what you can do. You can always get away if you don't feel comfortable".

If you like it, go for it: Dare. Respondents mainly advised not to hesitate. There is no bad experience and you will surely be enriched by any experience gained. They confirm this is hard and a lot of work, but they recommend gathering one's courage to do it.

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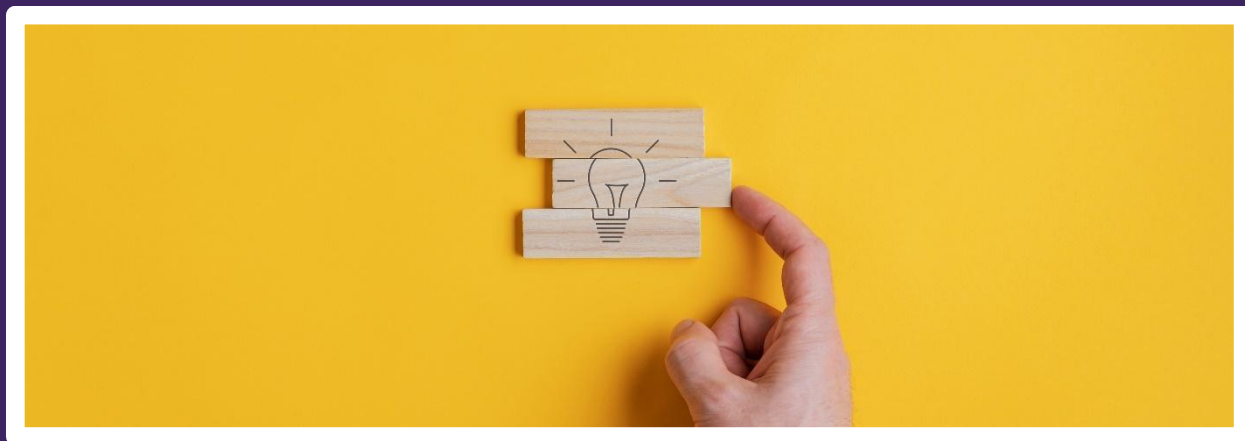
CONCLUSIONS AND KEY LEARNINGS

The interviews provided great insights into both the motivating factors and barriers hindering unemployed and/or low-qualified women and women in precarious employment, from retraining toward the coding profession.

The identified themes and key findings to explore are:

A more diverse representation of women coders

The clichés around the typical coder or developer are quite universally shared: a geek scientific male with hoodie, very technical, that is not very sociable. Debunking the bias around this representation is essential and is an area we can explore as part of the BWC project: representing successful retrained women, more diverse ethnicities, more diverse style of life, more diverse background etc…

One way to fight the bias around women, the supposed fact that they aren't made for coding/IT is to create opportunities where coders and specifically female coders can share their expertise with each other, learn from each other, mentor and reverse-mentor each other.

Preparing to support women in retraining toward coding professions

It was striking to see to what extent the women's success in retraining in coding jobs had been influenced by society around them believing in them: family, friends, colleagues… but especially by state organisations, employment centres, advisory bodies…. You cannot expect a woman to succeed when she is receiving no support, no help or encouragement from these entities around her. Then again, it is natural for parents or friends to be concerned about their child's or friend's success, especially in difficult economic contexts.

It could be interesting to rethink the way coding jobs are taught in employment centres and state organisations. How they sell the career and how they place women in coding. Some interviewees made comments on the lack of knowledge of their counsellors on the coding profession/IT fields. There is great room for improvement here, and an opportunity to raise employment centres' and advisory bodies' awareness on what unemployed and/or low-qualified women and women in precarious employment, need in terms of skillsets to retrain toward the coding professions. We can think of tools to help counsellors be better supporters for women, or even a fun toolbox for counsellors "How to convince women to retrain in coding jobs (or at least not be too influenced by their fears)?", etc... The key is to help women find the support they need to give them optimal chances of success. It is also important to explain to employment counsellors the insights of a coding profession. Indeed, some interviewees identified a difficulty on the hand of employment centres and organisations to give information about these jobs, that are seen as very technical. A key can be to make them understand coding jobs, popularising and defining the whys and wherefores of coding profession.

The beginning: a key moment

Helping women and supporting them, especially at the beginning of their journeys. Many of the interviewees shared their feeling of overwhelm when they were getting started, not really knowing where to begin or where to find help, a huge amount of work and everything new. Helping them let go of the fear of making mistakes and stressing the importance of getting started (small steps every day, clarity comes from action). The support and the follow-up from an organisation, association or employment counsellor is crucial at this point not to let women down in one of the most difficult phases of their retraining.

Being encouraging but realistic

As said earlier, many of the interviewees pointed out, a retraining venture is mostly a lot of hard work. It is important to be encouraging but realistic about the realities of retraining toward coding profession, what to expect when you're retraining. It is necessary not to lie to women, and to be realistic: retraining to a coding profession is an investment and it's very hard work, but it's worth it. Support is one of the keys to enable them to face this difficulty. Again associations, state organisations, employment centres can make a difference by improving their process of accompanying women in their path.

Encouraging networking and mentoring

Again, it is important to seek help all along a retraining path. Women should be able to rely on supportive and strong networks: associations, online networks, professional networks… It is important for a person in retraining to know where to ask specific or technical questions, questions that cannot be answered by members of the family. The help and advice provided by these different organisations will surely help women to face many difficulties in their retraining path.
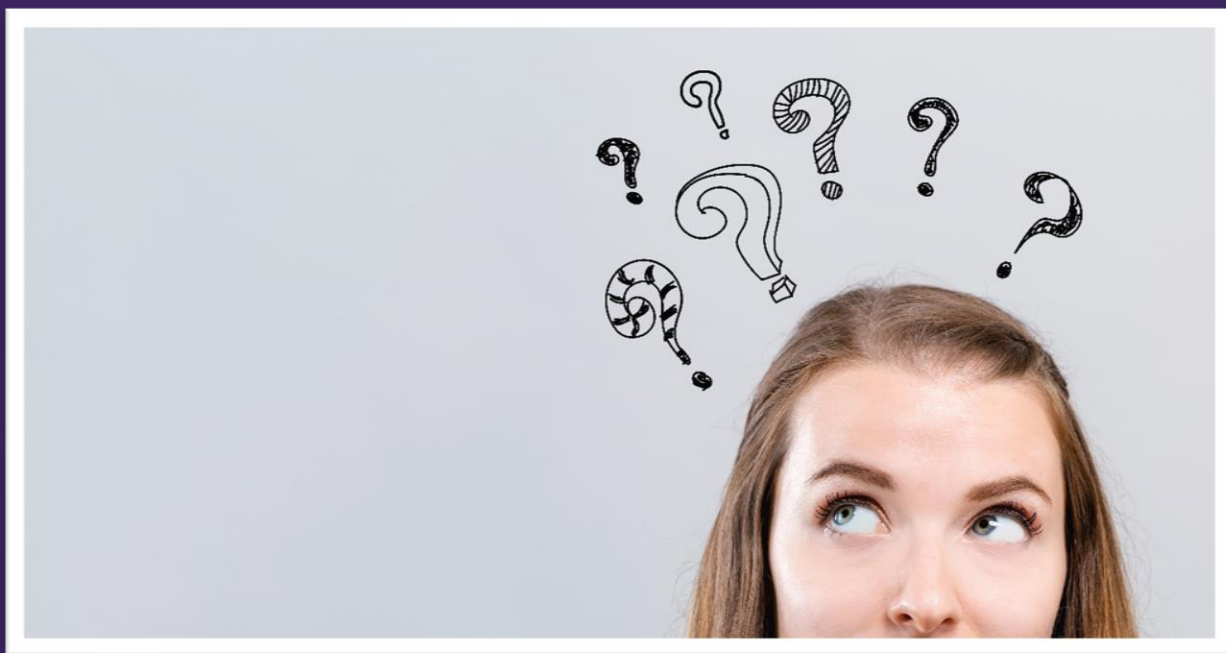
OPENING OUR PERSPECTIVES - THE EXAMPLE OF MALTA

The Educational System in Malta

Education in Malta is regulated by the Education Act of 1998 and subsequent amendments. The Ministry of Education is responsible for the administration, organisation, and the financial resources in state schools at all levels of education. Compulsory education between the age of 5 and 16 consists of a 6-year programme in Primary schools (age level 5 to 11) and a 5-year programme in Lower Secondary schools (age level 11 to 16). Post-secondary education is provided by a 2-year programme in Upper secondary school (age level 16 to 18) and by 2 to 4-year programmes in Vocational schools (age level 16 to 20). Tertiary education is provided by the University of Malta (age level 18+).

State education is free of charge from pre-primary up to tertiary level. Within the compulsory school age students attending state education are provided with free textbooks and school transport. The University of Malta, a state funded institution, provides tertiary education and is fully autonomous. The Malta College of Arts, Science and Technology and the Institute for Tourism Studies provide further and higher vocational education and training.

Further to receiving free tuition, full time students attending upper secondary/post-secondary institutions and university receive a maintenance grant directly credited in their bank account from the Government of Malta. The Students' Maintenance Grants' Scheme operates under a set of regulations, guidelines and the respective Legal Notice namely L.N. 308 of 2016 determining eligibility.

The above highly facilitates students that are interested in pursuing any profession as It removes the financial burden normally tied with education at tertiary level. For this reason, in Malta it is much less common to find people that retrain as adults than it is in other European countries with a different setup than the above.
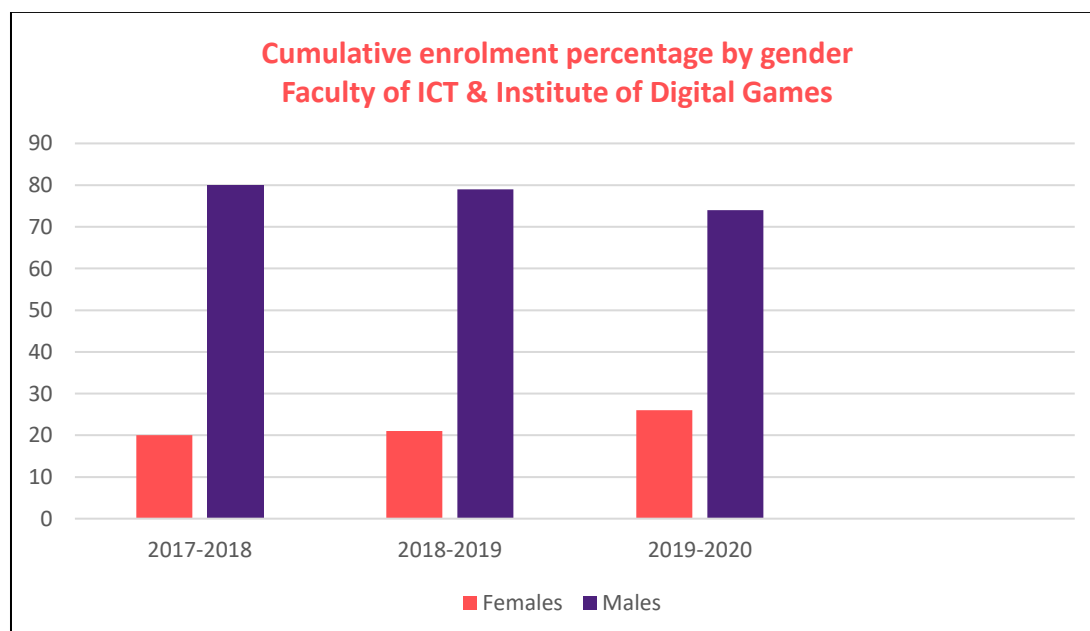
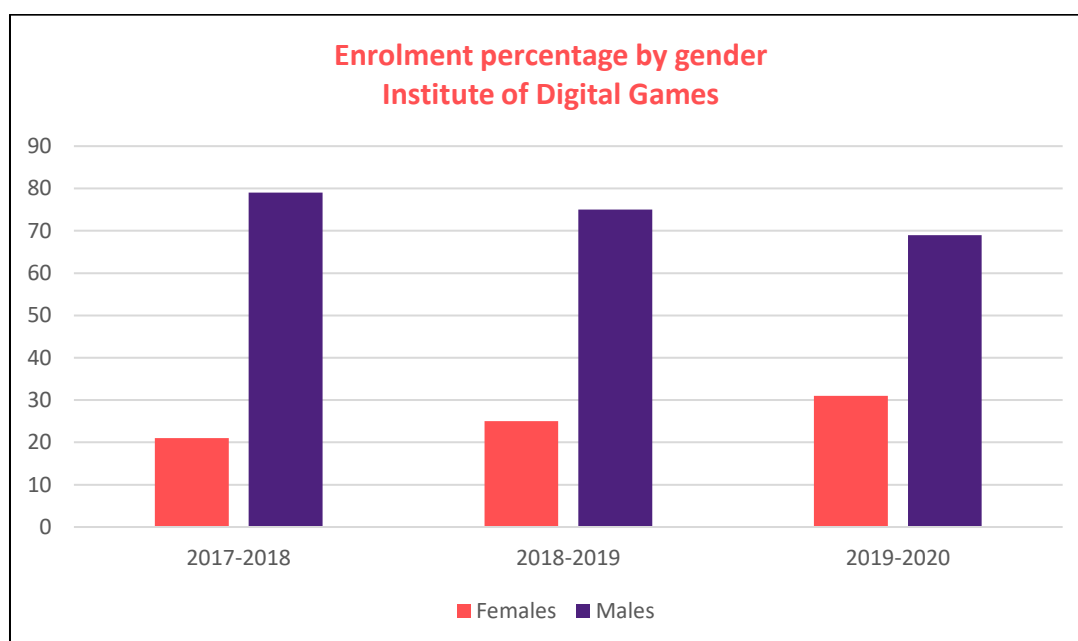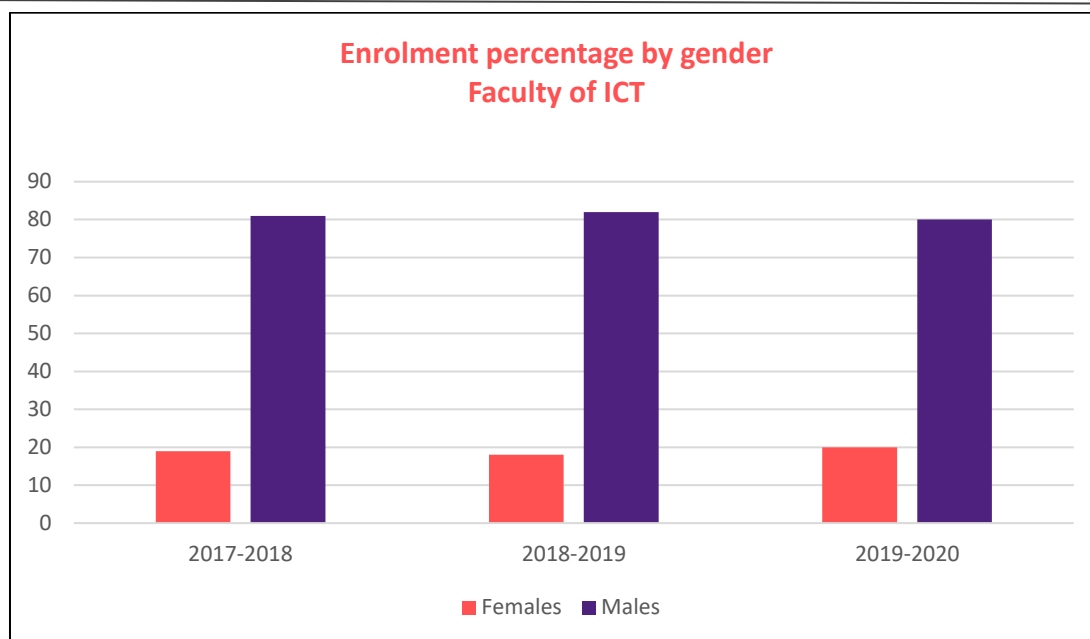http://becomewomancoder.eu/

Field Research Added Value

During the preparation work to Identify suitable testimonials for IO1, various groups and academies pointed to the fact that in general, females are not directed towards technical careers at any stage of their education. These Interviews brought forward on repeated occasions that such approach as is being proposed by "Becoming a Woman Coder" should be applied also by Guidance Teachers and Career Coaches within the secondary schools. If females are introduced to IT and coding professions at an early age, they will be able to shape their future around them by choosing the right path of studies with the correct options.
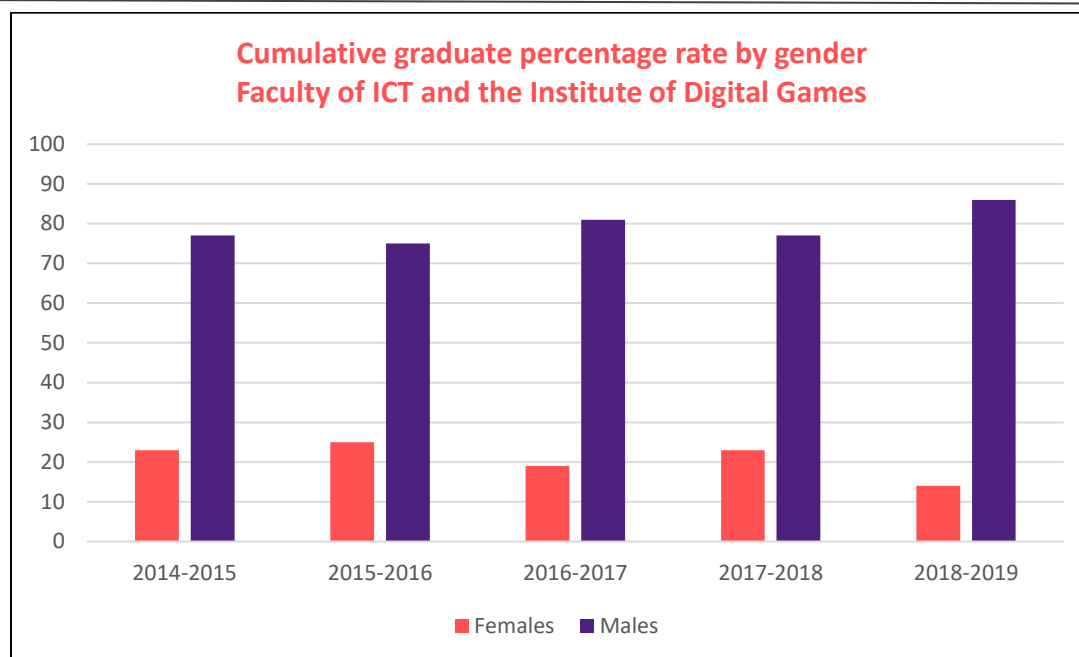
Although the other partners do not have a similar education system in their countries, they were also faced with this suggestion throughout their field research. This also reflects in the low representation of women in the Digital world across Europe as per the statements on the "Women in Digital" section of the European Commission Website:

https://ec.europa.eu/digital-single-market/en/women-digital-0

From the local perspective in Malta, this statement may be further substantiated by taking a look at statistics of students that have enrolled and graduated from the IT related faculties in the University of Malta (Faculty of Information and Communication Technology (ICT), Institute of Digital Games) in recent years.

Enrolment percentage by gender
Faculty of ICT

Enrolment percentage by gender
Institute of Digital Games

http://becomewomancoder.eu/

**Cumulative graduate percentage rate by gender
Faculty of ICT and the Institute of Digital Games**

Augmenting exposure, awareness, and involvement of female students in IT, coding and other digital related options would surely improve towards balancing out the percentages shown above.

Hence, targeting females from an early age has been identified as an important action to increase the representation of females in the digital Industry, which is also in line with the European Commission's strategy.

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