Women and ICT

An education perspective
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Kind hosts, esteemed guests, your Excellencies, thank you for inviting me to share this distinguished panel. This is an ICT conference and I have chosen to speak briefly about information and communication technologies from the prism of education, which is the main focus of my organisation, Graduate Women International. GWI is an international federation of 62 national organisations and members in another 40 countries, focused on empowering girls and women up to the highest levels through education – at school, university, in companies, with new technologies, and in all possible ways. Education begins at home, where notions of culture, science, emotional intelligence and other such features which serve all human beings in life are developed. Our focus is not in the home, rather it is at that crucial time when girls especially fall out of the system, namely in the transitions between primary and secondary schools, secondary school and university, and university and the workplace. ICTs are especially interesting subject as in this arena, like elsewhere, there is a phenomenon called the "leaky pipeline", where although girls and women are interested, trained and employed, they soon fall out to the detriment of society.

A few facts

- Of the 781 million illiterate people in the world, 2/3 are women
- 7 million people work in the ICT sector; 30% are women
- Only 6% of CEOs at the top 100 global tech companies are women
- Gender equality in the ICT sector would open up a market of USD 50-70 billion (UNESCO)

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Let me just provide a few facts to set the scene. Of the 781 million illiterate people in the world, two-thirds are women, indicating that the Sustainable Development Goals must include literacy and numeracy as part of the success indicators of the next round of global action in education. We would argue that computational skills are also necessary for tomorrow's children and youth to be able to fully take their places in society. While the figures of women in the global ICT workforce look apparently quite acceptable, in fact of the 30% of women who do wok in the ICT sector, only a small proportion are in the formal ICT sector, indicating that many women are losing out on equal pay, social rights and protection, and promotion possibilities to raise themselves and their children and families out of poverty. In South Africa for example, 51% of those working in the ICT sector are women but only 22% are employed in formal jobs. Yet technology is an enabler, as for example in the case of some women in Bangladesh whose husbands do not allow them to leave the house to work but who are quite happy for them to have cottage businesses and sell through the Internet. In all the Science, Technology, Engineering and Mathematics fields (so-called STEM) including ICTs, the higher up the ladder, the fewer women there are. Let us remember that women constitute 40% of the global workforce. Only 6% of the CEOs of the 100 top global technology companies are women, a shockingly low number when all the research demonstrates that women CEOs provide higher and better shareholder value over time. Whereas 45% of women reach higher positions in the service sector, only 19% reach executive level in the ICT Sector. In the United States alone, 45% of women leave the tech industries in the first year of employment. The premise is of course the home and the parental attitude to gender. Stereotyping begins early, and continues in school, where girls are encouraged to pursue humanities and social science subjects rather than STEM and ICT subjects. This represents, as you can see, an opportunity cost which for the ICT sector alone amounts to some 50-70 billion dollars. So how can we harness the extraordinary capabilities of what the French philosopher Simone de Beauvoir called the second sex?
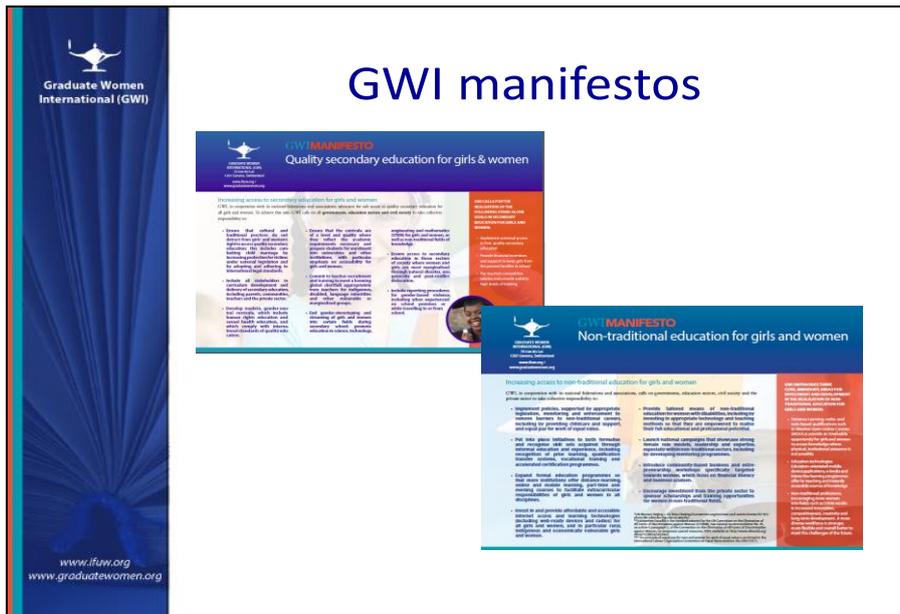
GWI manifestos

I would like to draw your attention to two of our five mission manifestos at GWI: the one on secondary education and the one on non-traditional education. I spoke earlier of the barriers that girls encounter. These include domestic responsibilities from an early age, child care, early marriage and unwanted pregnancies, unsafe access to schools, violence and harassment to, from and on school campuses, cultural and social stigma for disabled girls, who have the lowest access rates of all populations, lack or role models, and much more besides. Non-traditional education, another one of our priorities, includes the ICT and STEM areas, and should be looking at how to use new technologies to reach so far isolated populations – the underprivileged, indigenous peoples and the disabled. We only have a look around us at the number of creative apps and internet-based programmes that range from MOOCs to gaming to other areas where the human mind is creating huge opportunity for men and women alike. Computational thinking and learning is part of that. Finland has introduced programming for all children in primary schools, and Britain is introducing programming into secondary schools. This is a beginning, but I urge you to think of your own children and grandchildren. How many in this room have asked their son or granddaughter to show you how to use your new smartphone? My generation are digital immigrants; my children's generation are digital natives. This means that narrow learning that avoids creative thinking and computational skills across disciplines will not prepare future generations for life in the 21st century and beyond. There is a role for everyone to play in introducing these new ways and technologies. At the policy level governments need to ensure that each and every girl and boy has access to secondary school and that girls are enabled to follow STEM and IT classes. Equally, governments need to provide education budgets for teacher training and teacher salaries, and ensure that teachers access vocational training to adapt to new technologies throughout their careers. Governments also need to invest in infrastructure to ensure that their citizens have access to broadband regularly, so that learners can go online to get regular access to online education and resources. As per Goal 17 in the Sustainable Development Goals, there needs to be commitment by governments to operationlise the STEM and technology bank and to assist in capacity building for least developed countries, including intergovernmental partnership through North/South, South/South and triangular multilateral cooperation.

Digital natives vs digital immigrants

- Intergenerational divide
- «Leaky pipeline» – only 2.9% of women graduates have a computing degree
- ICT must be considered in terms of computational thinking, not just programming e.g. stats, neurology, science
- ICT education needs to start much earlier

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The intergenerational divide cannot be underestimated. Older generations are sometimes reluctant to take up new technologies and reluctant to learn new techniques. Interestingly, after the initial take up of Facebook by youngsters, the fastest growing Facebook population was the grandparents, who might not have accepted email but who realised that it was an easy way of staying in touch with their grandchildren. While companies struggle to keep the so-called generation Y involved, new technologies are changing the rules of hierarchy and engagement. A recent US study found that 45% of tech companies did not have a single woman executive and that leadership is overwhelmingly male. Yet generation Y expects and demands to have equal rights across the board, and fast promotions, irrespective of gender. Like the technologies that are blooming, education must consider a cross cutting computational approach to learning, data and ICTs. ICTs can facilitate learning and research across the board… even into politeness, as I discovered researching this talk! There is a paper out there entitled *A computational approach to politeness with application to social factors*, written by a group at Stanford. While big data is overwhelming our lives, do we have the analytical skill sets to identify in the big data the relevant threads? These are the kinds of educational training and enquiring minds that we need to be looking at developing over the next decades. So it all comes back to education, in the end. It is about bringing ICT and computational thinking into schools earlier, to both genders, and across subjects. It should not be the remit of the high cost, private schools. It is a remit that governments, policy makers, community leaders, religious leaders and educators must make available to the girls and boys of their countries. Skill sets and critical thinking, not just rote learning, need to be developed at early ages. Interactive teaching, practical exercises, testing failing and succeeding are all part of education. The joy of ICT is that anything is possible on the net – maths tests that are multiple choice, automatically corrected, can be done at whatever level is required. Languages can be learned, programming can be learned. Musical instruments and note reading can be learned – the whole world is at our fingertips, yet millions are still not enjoying it. Infrastructure is a key investment that many countries still have to make, even before they can begin to train teachers and students. Women account for more than 50% of the population in Africa, which is the continent that boasts the highest rate of women's entrepreneurship in the world. The majority of these women are concentrated in the informal, micro, low growth and low profit area. At the same time, sub-Saharan Africa has some of the world's lowest literacy rates. Imagine how the world would be if we could harness that energy and teach those women to read and use technology!

Actively encourage

- Policy level commitment to investment in new technologies and education
- Train teachers on computational thinking, programming and gender neutral ICT
- Teaching of computational thinking and programming early in the school career (end primary, beginning secondary)
- Ensure girls access secondary school
- Ensure girls are encouraged to follow STEM subjects incl. ICT

27 million teachers will be needed to achieve universal primary education by 2030. **Without action, it will be impossible to get all children into school by 2030.** Policy makers must commit resources to the teaching profession, as well as re-enhancing and re-evaluating the contribution of teachers. GWI advocates for a minimum 6% of GDP spend on education in every single country in the world, as education is the key to development. At a recent ICT conference in Beirut, Lebanon, the following comment was made: "In (North America) we have a talent shortage of tsunami level that's about to hit us because we can't produce enough engineers". So where are the women? It is evident that if girls do not finish secondary school then they cannot access tertiary education. The gender stereotyping and cultural and social barriers within secondary school mean that girls are not encouraged to select STEM and ICT pathways. There is another aspect to that too, which is that boys themselves need to encourage girls to study alongside them in these subjects. At GWI we had a brilliant honours student who interned with us. She was equally attracted by the humanities and by the sciences, notably engineering. She chose the humanities for several reasons, which are substantiated more widely: she would have been the only or one of the only girls in her class; she would have been considered a "geek" and not the accomplished young woman she truly is; she would not have had a peer group to be with, exchange ideas, gain support from and hang out with. These are issues that are informal and real. Furthermore, in the public eye successful women in ICT are rarely represented. Women like Sheryl Sandberg and Marissa Mayer, very visible in the media, are often portrayed as aggressive women, where if they had been men, they would be portrayed as successful and ambitious.

Safe spaces

- Peer groups of girls/women encouraging girls/women
- Find male champions to work with girls and women
- Encourage media to portray positive ICT stories about women

ICT is evolving as a community-based and community driven sector. Whether in Beirut, Lebanon, or Kenya, Nairobi, or Lausanne, Switzerland, the country in which GWI is based, there are tech hubs that are thriving, driving jobs and business. I sit on a seed funding jury that gives out funds for start-ups in Switzerland. Over the ten years I have been doing this, I have seen very few women. In companies, women are often side-lined for promotion and training as the perception is that a man will do better and be more faithful to the company. It is thus vital to create peer support groups and for men to mentor women, so that they are less alone in the technology fields. Infrastructure investments such as child care centres (Google is a great example in this sense), policy changes such as paternity leave (the Nordic countries have set the example in this) and commitments by the public and the private sector to involve more girls and women in STEM and ICT are all necessary to start changing the paradigm. Finally, in the public eye the media should be educated by schools, universities, businesses and governments alike to consider more positive stories and a change of language about women in technology, to showcase more positive examples and encourage more girls to select those subjects. It is the joint effort of both genders, male and female, that will encourage societies to change and be more inclusive, so that girls and women can play their full part in the ICT arena.

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Thank you.