GOODBYE TO THE IT GIRL?WHY ARE YOUNG GIRLS DESERTING TECHNOLOGY?

INTERNATIONAL WOMEN'S DAY
High-level Panel debate
ITU headquarters, **March 10 2011**

Moderator:
Ms Doreen Bogdan-Martin, Chief, Strategic Planning & Membership, ITU
Participants:
Ms Jasna Matić, Minister for Telecommunications and Information Society, Serbian Republic
Ms Suvi Lindén, Minister of Communications, Finland
Mr Victor Agnellini, VP, Transformation, Alcatel-Lucent
*Ms Alethea Lodge-Clarke, Programme Manager, Public Private Partnerships & Digigirlz, Microsoft*
Dr Anastasia Ailamaki, Director, DIAS Lab, School of Computer & Communication Sciences, EPFL
Dr Speranza Ndege, Director, Institute of Open, Distance & e-Learning, Kenyatta University, Kenya
Mr Inal Uygur, Head of Processes and Projects, International School of Geneva
Ms Aurora Velez, Chief Producer, Learning World series, Euronews
Ms Gitanjali Sah, Analyst, ITU
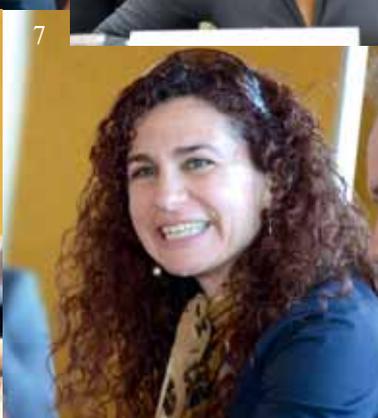
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To commemorate the 100th anniversary of *INTERNATIONAL WOMEN'S DAY, ITU hosted a High-Level Panel Debate on the issue of declining female participation in the information and communication technology industry.*

It's a little-known fact that women were the original programmers of ENIAC, the US government's first ever computer. But while teenage girls now use computers and the Internet at rates similar to boys, they are five times less likely to consider a technology-related career.

It wasn't always so. In the US in the 1980s, for example, young women were earning 37% of computer science degrees; today, that number has fallen to below 20%.

This lack of trained female professionals in turn means that in OECD countries, women now account for under 20% of ICT specialists. It also means that most developed countries are forecasting an alarming shortfall in the number of skilled staff to fill upcoming jobs in the ICT sector. The European Union calculates that in 10 years' time there will be 300,000 more ICT jobs than there are EU professionals to fill them; globally, the shortfall is closer to 1.2 million.

ᴢURNING GIRLS ON TO TECHNOLOGY

With computer and information systems managers consistently ranked among the top 20 best-paying jobs – on a par with surgeons, orthodontists, airline pilots and lawyers – why are young women turning their backs on technology? ITU's High-level Panel of experts from government, the ICT industry, the education sector and the media agreed that major problems include a poor perception of the industry among girls, and a lack of inspiring role models.

The debate began with opening remarks by Ms Doreen Bodgan-Martin, ITU's Chief, Strategic Planning and Membership. She noted that the theme of this year's International Women's Day – *Equal access to education, training and science and technology: Pathway to decent work for women* – is particularly relevant for ITU, as the UN specialized agency for information and communication technologies, and cited a quote from the global business magazine *The Economist*: 'Forget China, India and the Internet: economic growth is driven by women.'

"ICTs offer a clear path forwards and upwards for girls and women in every country on earth," she said. "This is nothing like as widely recognized as it should be – and we will be discussing the reasons why, and potential remedies, during this round table.

"Let me ask this: What girl wouldn't want to go into a field where there is a clear need for the skills; where the salaries are among the best in the jobs market; and where you can make a real difference in advancing social and economic development?"

Ms Bogdan-Martin's opening remarks were followed by the screening of a special International Women's Day television programme from Learning World, the Euronews series focused on global education.

The programme featured a profile of the Renate Centre in Trondheim, Norway, which is adopting a variety of creative approaches in recruiting girls to study sciences and technology, including school talks by graduate science students, and even a catwalk show of women wearing scientists' workwear.

The panel discussion then kicked off with a question to Ms Jasna Matić, Serbia's Minister of Telecommunications and Information Society.

BOGDAN-MARTIN: Minister Matić holds an engineering degree and worked as a civil engineer before becoming a government advisor and then consultant to the World Bank in Washington. She held several high-ranking government roles before becoming Minister in 2008.

Minister, as a woman who chose to study engineering, you must have some experience of attitudes to women joining largely male domains. How important is support and encouragement for women joining traditionally male fields?

MATIĆ: When I was fifteen I chose maths as my major, and found myself in a class of three girls and 24 boys. Interestingly, the three girls were the very top maths students. Only we dared to major in maths. The girls who were less good did not dare, and did not get encouragement at home like we did. This was obviously not the case for the 24 boys, who did receive encouragement, even though many were clearly not the best in their class. So less-good boys dared to pursue maths.

At university, one of my professors remarked that the girls in my engineering class 'were only there to get married'. So we see the entrenched beliefs – beliefs that I still experience in my job today. Role models are very important. At the launch of UN Women in New York last month, one of the special guests – a female astronaut – remarked that 'you need reality to create fantasy'. She meant that you need to see something as possible in order to dream about it. We need to encourage girls to pursue their dreams, and pursue careers in this transformational sector. There are vast opportunities, and we need to help make it an easier path for today's girls than it was for us.

BOGDAN-MARTIN: Let's have a look at things from the private sector viewpoint, and ask Victor Agnellini for his views. Victor is Global Senior Vice-President, Transformation, at Alcatel-Lucent, where he manages the strategies and programmes that are keeping his company at the forefront of ICT evolution worldwide. Victor, your company is one of the biggest R&D players in the world. Are you fearful of a skills shortage in the Western world because girls are turning their backs on ICT studies?

AGNELLINI: We're a global company with a presence in 130 countries, and we're working to increase gender diversity in all different branches of the company. But we find there's a challenge when we try to increase gender balance in entry-level jobs, because there's a lower number of women with ICT degrees. We've been actively looking at how we can increase this, and we observed that one of the potential bottlenecks is at the very early stages, well before college. We need to increase younger girls' interest in ICTs. So through the Alcatel-Lucent Foundation that I have the privilege of chairing, we're targeting young women and girls throughout the world through a new programme that will reach 13,500 young people, of whom 70% will be female. We hope that this will really help open up the funnel. We're also working to engage other companies, to partner with them, to help increase the base of women in the ICT domain.

BOGDAN-MARTIN: Suvi Lindén, Finland's Minister for Communications, has a degree in Computer Science as well as a Master of Science degree. She made headlines around the world last year when Finland became the first country in the world to make broadband access a legal right for every citizen.

Minister Lindén, in the OECD's Programme for International Student Assessment 2010, Finland ranked in 2nd position in mathematics and 1st position in science. Finnish girls were better than boys in science, and in maths girls and boys did equally well. But fewer than 25% of students studying technology at university level are women. Girls are doing well in maths and science at school but don't choose these subjects later. What could be behind this trend?

LINDÉN: In Finland we're facing the same challenges as developing countries worldwide. There are not enough role models, and girls tend to think that technology is 'too nerdy', not trendy. Finland is a very ICT-driven country because of Nokia. We have many many engineers. But even though girls do well in high school at maths and sciences, still they choose to be doctors or nurses or teachers, not engineers.

We do work hard to make engineering more appealing, but there's a public feeling that Finland might have too many engineering students, so this is also putting girls off. We're already talking about ubiquitous communications, where it's no longer just people communicating, but machines too. This could open up new possibilities for women, because when they see that ICT permeates all aspects of life, it might make the field more interesting. For girls, it would mean that they can combine their interest in other sectors like elderly care or teaching with ICT engineering.

I believe women have an advantage in terms of being skilled at devising user interfaces that are friendly and simple. There's a big gap here, and I think women can make a difference, so I am quite optimistic for the future.

BOGDAN-MARTIN: Let's turn to our next panelist, Professor Anastasia Ailamaki, who comes from academia. Professor Ailamaki is Director of the Data-Intensive Applications and Systems Laboratory at the Ecole Polytechnique Fédérale de Lausanne, and Adjunct Professor at Carnegie Mellon University. Professor, I believe you were among the very first female students to be accepted into computer science studies in Greece. Could you tell us a little about why you chose this subject, and what it was like being one of just nine girls in a class of over 150?

AILAMAKI: I was intending to become a chemical engineer, and had never seen a computer before I enrolled in computer engineering. There was a new school, and I was told it would be too hard to get into. So I became determined to pursue

this career. At the time, computers were not in everyone's home, in everyone's pocket. They were very remote from real life. So the course was perceived as one where you would do deep research, solve complex meta-problems that may eventually have some application in the ordinary world.

Yes, nine women, 149 boys. We didn't think about it too much. We concentrated on what we were working on. At EPFL, women's enrolment in computer science peaked in 2003/2004, then declined. Young people seem to be reluctant to go into computer science. The girls have an image of computer science as unwashed boys doing programming surrounded by empty pizza boxes. What girls tend to want to do is create a difference. They need to see the engineering element to understand that they could do this – but in today's devices and services this element is hidden.

I think to enable people to think about the science part, we need to educate them about how the science behind computers could solve very important problems in the world in areas like life sciences, medicine, astronomy. Getting the education right is the key.

BOGDAN-MARTIN: Let's hear now from a broadcaster, Aurora Velez. Aurora is Chief Producer of Euronews's flagship education series Learning World, a weekly programme that takes viewers around the world to look at challenges, trends and success stories in global education. Aurora, this very interesting story from Norway highlights some key points that have been raised by other speakers, such as the importance of role models. The catwalk shows are a fun and innovative way of raising awareness. And getting tertiary students in front of high school girls who are yet to make their career choice has great potential for expanding girls' horizons. Do you think European governments need to follow in Norway's footsteps and be more proactive and innovative when it comes to girls' education? And in researching your stories, have you ever seen examples of governments and the private sector teaming up in this way?

VELEZ: In researching Learning World we've seen northern European countries stand out in terms of their contact and relationship with students. Finland, Sweden and Denmark all serve as models of education. And you've all just seen the example from Norway. The European Union doesn't have a Union-wide approach to education. There are regional programmes – Leonardo, Erasmus and so on – but education is primarily a national government responsibility. Learning World is a global programme with over 300 million viewers in 151 countries. We look for good examples of innovation in the world of education. As regards private initiatives, we just did a programme in Kenya where a private school partnered with a local authority to assist girls to further develop their knowledge. In order to move forward, let's look to the north of Europe, to see the many good initiatives happening there, and let's also look outside Europe to the South, to see how they are approaching the same problems.

BOGDAN-MARTIN: Let's return to academia, and ask for some comments from Mr Inal Uygur. Inal holds a BSc. in Computer Science and Engineering from MIT, and spent over 20 years as an ICT professional before taking up his present role as Head of Processes & Projects at the International School of Geneva, where he teaches the Theory of Knowledge. Inal, as a teacher yourself, how much influence do you think teachers have over students' career choices? Do you think teachers are deliberately putting girls off – or it is more insidious than that?

UYGUR: I have an advantage in that I am not like a typical teacher, who went to school, and then went to school. I think my industry experience means I can look at school from a slightly more objective viewpoint. I teach 17-18 year olds, and I think it is important to put oneself in the position of the student.

We see an enormous influence from parents, and also a huge influence from teachers. Teachers are the ones who hold the authority on knowledge – even above parents. I'm aware that I have a huge influence on my kids. Then you also have their peers, and you have whatever their dreams are. Kids don't have much else. So for a kid to answer the question 'what are you going to do?' is very difficult because they don't really know anything about where they're going.

What's important to recognize is that today, parents don't know much more. It is hard to predict the shape of the world even five years down the track. Do teachers have influence on choices? Yes. Do they do it on purpose? It might be more subtle than that. I have colleagues who definitely do turn girls off science and maths. But most of them do it sincerely, they think they're helping them because girls aren't good at these subjects. It's a generational thing. They were taught to believe this, and they're passing it on. Today, the world is moving so fast that there is a change from generation to generation. This creates a problem upstream in schools, because the world that teachers grew up in is not the world their students are growing up in. They think they're helping, but often they're unconsciously part of the problem.

BOGDAN-MARTIN: Moving back to the private sector, let's hear from Alethea Lodge-Clarke. Alethea was born and raised in Jamaica, but is now based in the USA, where she heads up Microsoft's Program for Public Private Partnerships, with a special focus on programmes that can empower girls and women. Alethea, could you tell us a little about Microsoft's Digigirlz programme – what it is, and how does it work?

LODGE-CLARK: Digigirlz started about ten years, ago, and was the brainchild of a few female developers at the company who saw that there was a shortage of girls and young women coming into ICTs. The statistics from the US are clear: looking at percentages of those taking the Advanced Placement exam at senior high school for maths and computer science in 2008, 17% were female. At undergraduate level, about 18% of computer science students are female, so we don't see much of a shift. But look back to 1985, and 37% of computer science students were female. So we have a decline over time of about 79%.

It's a big concern, and we've heard a lot about the 'leaky pipeline'. We clearly need to get things going, to get more girls into the pipeline. Digigirlz is a one-day event, held at Microsoft campuses worldwide, and there's also a Digigirlz Boot Camp, which is a two-day event. The programme is basically designed to dispel the myths about maths and science, get girls' confidence levels up, and share with them what it's like to work in the high-tech industry. They get to meet Microsoft employees, see demonstrations of products and how things work, and see how the maths and science they learn in the classroom can be applied to real life.

BOGDAN-MARTIN: Turning now to a woman who works right here at ITU, let's talk to Policy Analyst Gitanjali Sah. Gitanjali specializes in implementation of ICT4D and e-governance projects. She has contributed towards National and State Policy processes in India, including draft policy on ICT in school education. Gitanjali, coming from India, I'd like to invite you to bring a regional perspective to this debate, as an ICT analyst. What's the situation for girls looking to study science and especially ICTs in your country?

SAH: Women in general in south Asia are under-represented in science and technology – the problem in the region is very similar to what we're seeing elsewhere. In traditional societies like ours, women are expected to be super-Mums, super-cooks, super-wives and super-employees, and it is not easy. But that said, being a doctor or an engineer is very prestigious, so girls' parents now often encourage or even pressurize them to take up technology courses. This is one reason why we do see girls going into technology in India; it not only provides you with a lucrative job, but also with high social standing. There's another aspect too – studying technology for women can be a feather in their cap because it can bring them a good marriage alliance. You can often find in newspapers and on websites advertisements which say 'Seeking an engineer bride'. ICT qualifications can be a way of getting a good husband. So in south Asia there are cultural and social elements that need to be thrown into the mix, as well as the other aspects panelists have discussed.

BOGDAN-MARTIN: Completing our distinguished panelists, let's turn now to Dr Speranza Ndege. Dr Ndege is an ICT/e-Learning specialist with a background in Computer Based Information Systems. She was former head of the African Virtual University Learning Centre, and now serves as Direc-

tor of the Institute of Open, Distance and e-Learning at Kenya's Kenyatta University. Dr Ndege, after you completed studies in social sciences, you opted to further your studies in the ICT field. You've remarked that you met with a lot of resistance from male colleagues. What were their objections to a woman moving into this field?

NDEGE: In Africa we are very determined not to lag behind, so we have a commitment to catch up and to embrace new technology. In 1997 in Kenya and some other countries in Africa, the African Virtual University partnered with the World Bank and started offering courses in computer literacy through a number of educational institutions.

"They felt they were better qualified than me – they told me I was 'not ICT-compliant' and should not be in meetings where technology was discussed."

Around 1999, I personally did my own first computer literacy class. As a result I decided to get into the Internet, and studied in Belgium for four months. On my return, the university asked me if I could do a website for the university. At the time, websites were virtually unknown. People were surprised that someone with a background in literature and linguistics could embark on such a project. We had a department of ICT, and the men in this department – there were no women – told me that I was not welcome in the ICT domain. They felt they were better qualified than me – they told me I was 'not ICT-compliant' and should not be in meetings where technology was discussed. I was very uncomfortable, very nervous.

I decided to do something about it, and immersed myself in learning about information and communication technology. I enrolled for a Masters in computer-based learning systems with a UK university. This course was very complex, and very broad. There was so much to the field. And once I had the qualification, I did find that I was better accepted. As a woman, I have been very motivated to exploit the power of this technology for education via distance learning. I am very pleased that the government of Kenya is supporting this, and computer studies are now included in the curriculum of secondary schools. At Kenyatta University, we've also made it compulsory for all first year students to study computer literacy. We do still have a very big imbalance in girls studying computer-related subjects, but I do believe this is improving.

QUESTIONS FROM THE FLOOR

BOGDAN-MARTIN: Great input from all the panelists, and I'd like to continue by looking at some concrete actions we might take to redress the problem. But before that, I'll throw the floor open to questions.

PARTICIPANT FROM CHINESE MISSION, GENEVA: China is the most populous country in the world, which of course means we also have the most women of any country. So that means we could achieve much if we could harness the potential of women in our country. I know that ICTs will play an important role in bridging the gap between men and women, and I hope ITU will help to compile best practices and success stories from around the world so that we can learn from one another's' experiences.

PARTICIPANT FROM COSTA RICAN MISSION, GENEVA: I used to be an athlete. I managed to enter a very male-dominated field because I was judged by the stopwatch, not my teachers. I later went on to study at a business school in Costa Rica founded by Harvard University, with my parents' encouragement. I'd like to pick up on what Minister Matić said. I had a lot of encouragement from my parents to break into traditionally male domains. They boosted my confidence and supported me. And I think the encouragement of parents is very important. I'd like to know what the industry is doing when it comes to educating parents about fostering their children's aspirations. And a question directly to Alethea Lodge-Clark – have you done Digigirlz in Costa Rica?

LODGE-CLARK: Digigirlz is now worldwide. It started with 30 girls; we now have over 4,000. In every country where Microsoft has a presence, there's an opportunity to host a Digigirlz event. Our goal is to boost girls' confidence, and not just in the area of ICTs. Girls tend to lack confidence.

AGNELLINI: Regarding the programme I was speaking of earlier, which will target 13,500 students worldwide, of whom 70% will be girls, we have already pledged US$6 million over three years and will be working in several countries, and also linking to other programmes we already have running. From the corporate side, in the area of leadership, if you want to improve something you first need to measure it. We now actively measure gender participation, not just in existing areas, but when trying to identify new talent, new leadership. We need to ensure that we have additional girls coming into the pipeline and we've set clear objectives. We're not just talking about bringing girls in, but focusing on leadership too. We're really trying to close the gap.

AILAMAKI: This comment about parents is particularly apposite. Of course we can't put the parents in the classroom. Parents are influenced by many things – media, advertising. Parents are extremely influential on their children. I see this every day at the university. I have lost many promising students to parents. I have heard the words 'my mom said I should probably not do a PhD' – such a crushing blow to a teacher who recognizes a student's talent. I think we're probably not harnessing the power of the media enough to influence parents, because this could make a big difference.

BOGDAN-MARTIN: Could I turn to Minster Matić for a comment? You've identified the lack of role models as a real concern, and you've recently launched the Global Network for Women ICT Decision Makers. Could you tell us a little about your vision for this network?

MATIĆ: We need to help the younger generation. This global network is based on ITU's Women's Breakfast initiative, which has become a fixture at ITU conferences. We saw the enthusiasm and energy generated by this event, and decided we should try to harness that year-round. At ITU's Guadalajara Plenipotentiary Conference last year, delegates adopted a Resolution which established the Global Network for Women ICT Decision Makers, and we launched this in New York on February 25 during the UN Commission on the Status of Women, with the support of Michelle Bachelet, the Executive Director of UN Women .

The network comprises women from right around the world. These women serve as models of the success women can have in ICT to young girls, educators and parents, with the aim of encouraging girls to pursue careers in technology. We now have a website and a range of toolkits for institutions and organizations – shadowing, mentoring, and Girls Day – explaining resources needed to run these programmes at a local level.

MAKING A DIFFERENCE— *ONE STUDENT'S STORY*

Although barriers and prejudices are still strong when girls and young women try to be a part of the ICT academic and professional environment, the trend shows that girls are increasingly interested in this field.

In my university, my female counterparts and I are all part of the student organization FONIS, and we've created a female chapter of the organization named **ITgirls.** Our goal is to reach out to girls and women in Serbia and support and encourage them in technical high schools, universities, and ICT careers.

In the course of our studies, we've noticed that girls tend to be shyer and more reluctant to express their ideas and ask questions in class. Their tendency to be intimidated by the male-dominated environment in which they find themselves often leads to their true capabilities being underestimated. Interestingly, inside our female-only club, the situation is quite the opposite: communication is open, girls are eager to exchange ideas, ask questions, and discuss various topics.

This has convinced us that women who are already decision makers in the ICT field could make a big difference to younger girls who are just starting out, if they would be willing to share their knowledge and professional experience with those who are considering joining this interesting, creative, and ever-changing field.

Our plan is to expand our female ICT club locally, and to forge partnerships with similar organizations globally. We hope to connect with women in ICT wherever they may be working – in the government sector, UN organizations and NGOs, academia or private industry. We're convinced that this kind of networking and cooperation will create a mechanism that will bring more women into ICT, and help forge a new generation of women ICT leaders.

We believe that women can and should contribute to the evolving ICT field just as much as men. The message is simple: IT is for girls, too.

Milica Galić
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Milica Galić accompanied the Serbian delegation, and made a short presentation at the pre-event briefing for speakers. While she did not get the chance to make her presentation during the event itself, it is included as a source of useful and inspiring information.

RETURN TO PANEL DISCUSSION

BOGDAN-MARTIN: I'd like to pursue this issue of role models. Minister Lindén, how can we make studying ICTs attractive to girls, and do role models matter, in your view?

LINDÉN: Yes, role models are very important. In Finland we have a female president and prime minister, and half of our MPs are women. We're looking at how we now get more women leaders in business, and in technology. I think it starts at school.

My eight year old daughter liked maths, but she's now telling me it is too hard. She seems to be influenced by her classmates to believe that she cannot do it, even though she clearly can. We have studies in Finland that measure the influence of adults. Even at three and four years old, we see girls doing girls' things, and boys doing boys' things. The problem is that we tend to define technology as a 'boys' thing'. I'm very happy to see the emergence of new technologies and social media, because I think this is opening up new possibilities for girls and showing them new and exciting ways that ICTs can be used. Games for example – these are for entertainment, but often also for learning. There are a lot of opportunities to increasingly combine engineering and science with more creative elements, which I believe might appeal more to girls. We also need to maintain the global discussion on this issue, and on women's participation in all sectors of society.

BOGDAN-MARTIN: Inal, tell us what you believe informs the choices children make. Do role models matter? What about the media? If someone were to produce a popular TV show with a bunch of women engineers, would that make a difference?

UYGUR: Yes. And is it true that eight year olds influence other eight year olds? Yes. Remember that parents and teachers are both from a previous generation, and it's very hard for them too. How do they imagine what's best for their children? They know they can't use their own models as a reference. And for kids, they know they can't ask their parents and teachers,
because they really don't know. There's a big problem. With the Internet, the key is not power, it is collaboration. And women are much better at collaborating. Those skills are going to be very useful in the future. We have the capacity to create new role models now, so yes role models are key, and can speed the whole process up.

BOGDAN-MARTIN: Let's return to the floor for one more question.

JANE HODGES, DIRECTOR, ILO BUREAU FOR GENDER EQUALITY: What is really the role of the state? Other issues that need to be addressed include equal pay for equally-valuable work. What about the double work burden of professional and home life, and what do we do for women who missed out when they were younger? What about the idea of lifelong learning? Governments definitely have a role to play here.

MATIĆ: Most countries do have equal gender pay regulations, but of course in practice the reality usually turns out to be unequal. The pressure to change this has to come from women. Sadly, right now, many women participate gladly in this discrimination. Women sometimes even advocate for unequal treatment. The change needs to be brought by the young generation. Our generation has fought hard, and has achieved as much as it could. We need the younger women to take up the battle.

NDEGE: I want to take up the issue of lifelong learning. At Kenyatta University we have nine e-learning centres which teach mature students who are already out in the workforce, many of whom did not have the chance to follow tertiary education courses when they were younger. These centres provide training on how to use ICTs for learning, and we find students are adept and enthusiastic. There is no age when you cannot use technology. A professor at my university asked me if, at 70, he was too old to learn technology. I told him no, technology is accessible to everyone – and these days that professor carries a laptop. As long as somebody gives you the confidence you can do it. This is what is so missing from so many of our girls. They need confidence. We need to de-mystify technology, there is nothing hard about using a computer.

AGNELLINI: We need to be smarter in the way we transfer knowledge. It needs to go two ways. We need to target new learning opportunities for different generations. Not just older but younger, because the attention span of young people is much shorter. So we need to deliver tailored learning. This will mean more video, as it is very accessible. We need to blend a mix of the best ways we can deliver appropriate learning to different target groups, and technology can help.

LODGE-CLARK: Coming back to the parents' role, studies show that 56% of fathers influence their girls' career choices, and 46% of mothers influence their girls' career choices; so it is incumbent upon all of us to help steer girls in the right direction. In terms of young children, I recently showed my own young sons a new TIMSS report, which measures the mathematics and science achievement of US 4th and 8th grade students compared to that of students in other countries. The US ranks about 8th/9th/10th in the world. These figures influence kids' career choices too, even at a young age. We're living in a global village now where kids are getting information on their potential futures from a huge range of sources.

SAH: The Indian government has invested a lot in technological training, particularly the prestigious Indian Institutes of Technology that are present in many different states in India. In 2006, they noticed that not too many girls were applying, and they decided to slash the enrolment fee for female students to half. This resulted in a dramatic increase in the number of girl applicants. Another good example is Indira Gandhi National Open University, the largest distance learning institution in the world, and fifth largest educational institution globally. This is bringing the chance of education to a huge number of women who did not have previously have access.

INAL: As regards older women, there's no question of their capability, but we come back to the issue of confidence. We're living in what we could call a meritocracy. People's value in this culture is related directly to how much they earn. But you could argue that the most important job of all is being a mother, and that job doesn't get paid. So there's a contradiction there. To improve confidence, that cultural environment needs to change.

AILAMAKI: I believe women are 'born engineers'. They naturally pipeline work, they parallelize work, they come up with solutions quickly to ad hoc problems, they are natural problem solvers, they are very resourceful; that's exactly the description of a good engineer.

The panel discussion closed with the screening of a second programme from the Learning World International Women's Day special featuring space scientist Dr Maggie Aderin-Pocock, who is now spending part of her time speaking at events designed to encourage young women to follow their dreams, particularly in the area of science and technology.

"I think many girls are put off a science career and I think mainly because they see it as boy-oriented and they don't see themselves, if they are young and glamorous, fitting into that sort of area," Dr Aderin-Pocock said. "So I think we need to encourage them. There is an image of a sort of fuddy duddy sort of guy."