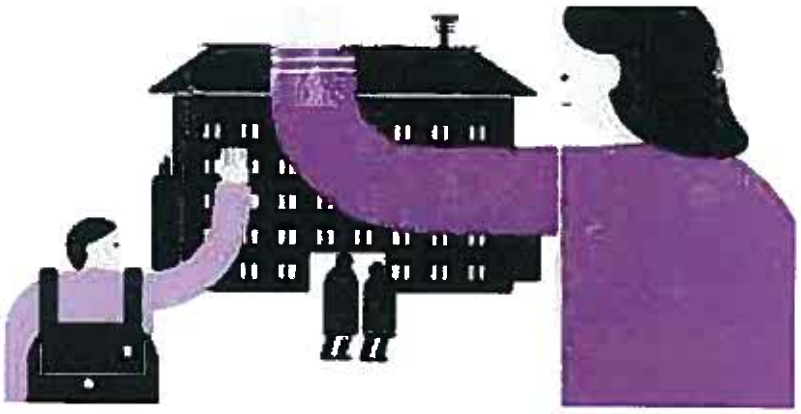
THE TIMES
Blogs

School Gate



How can we encourage more girls to study physics?

Sarah Ebner
January 08 2013 14:01P

How can we encourage more girls to study physics? It's a conundrum and one which is particularly marked in state schools. Physics is the 19th most popular A-level subject for girls, but fourth most popular for boys, while research by the Institute of Physics (IOP) found that nearly half of all state schools in England didn't have any girls studying A-level physics (you can read that report here). Girls at single sex schools were far more likely to study the subject.

I'm not sure why this is so, although it's true that the proportion of girls choosing A level physics has been consistent for more than 20 years. Is it to do with the perception of the subject being for boys (biology is generally seen as more "female" for some reason), a lack of female physics teachers, or that old favourite (media bias)? Or could there be another reason? The Girls' Day School Trust puts a great deal of the blame on stereotypes (arguing that the lack of stereotypes at girls' schools help to explain why so many more of their pupils study the sciences).

It seems that the issue is true outside the UK too. At Yale University in the US, they have a girls' science programme to try to encourage young women to study or work in these subjects, while Debbie Chachra, Associate Professor of Materials Science at the Franklin W Olin College of Engineering in Massachusetts believes that gender "schemas" are a big part of the problem.

"We all have gender schemas in our heads, mental models that tell us how the different genders are supposed to behave, what they're supposed to like, and so on," she told me. "And one of these models is that boys like science and girls like the arts. So if you're a girl who's taking (or considering taking) physics classes, you're at odds with the schema, and it comes out in small social interactions, like people consistently being surprised when you say what you're studying. But the cumulative message is that you don't belong. So, even just being consciously aware that these schemas exist can help you understand that it's not that you don't belong in physics or aren't good at it, but that there's some friction as you rub up against these cultural norms."

Dr Chachra also pointed me towards a letter which she wrote to her younger self explaining why she should continue to study maths and science. It's definitely worth a read, and I shall be passing it onto my daughter.

Meanwhile in Finland, there are also moves to persuade girls that physics is for them. This leads me to today's guest post, by Dr Ainomaija Haarla, president and CEO of Technology Academy Finland, which runs the Millennium Youth Camp and the Millennium Technology Prize. Here she explains the Finnish experience of trying to encourage girls to study physics.

"Towards the end of last year Finnish computer programmer Linus Torvalds, who won the Millennium Technology Prize 2012 for his work on open source operating systems, was speaking in Helsinki to the Technology Academy Finland (TAF) Millennium Youth Forum.

'One of the things that we see as a problem in the OS community,' said Torvalds, now based on the West Coast of the US, 'is there are almost zero female programmers. I don't know why this is.'

Low levels of female participation in both computing and physics, at school and degree level, is of concern not only in Finland but also in the UK. Physics is particularly in the spotlight.

Finland's track record in facilitating girls studying physics is only marginally better than that of the UK. Last year 23% of Finnish students matriculating in physics 'long courses' – the Finnish equivalent of A Level specialisation in physics – were female, compared to the 21% of all A Level physics students in the UK who are female.

These days it is extremely rare for female Finnish school level physics and degree level engineering students to encounter gender discrimination. Finnish teachers actively encourage girls to study physics, often urging them not to give up when they encounter difficulties. Individual teachers consciously strive to achieve a 50/50 gender balance on science and optional maths courses. Unlike the UK, in Finland students are encouraged to pursue a mix of science and humanities beyond the age of sixteen.

But something is still putting girls off physics in Finland, as it is elsewhere. One of the key challenges currently facing our society at a global level is how to improve and maintain the quality of human life using new and sustainable technologies, and this is not going to be met if there is a brain drain away from the engineering profession.

Engineering is one of the most popular career choices given by boys at an age when they have little idea of what is actually involved in the job. While girls may not say they want to be engineers because it is the profession they are expected to

choose, it is common for female students to experience a specific epiphany, a moment of inspiration, in which they realise that the things that they are personally interested in involve specific machines, and they can find jobs in which they work making these machines or improving their functionality.

For example, a girl who is a keen classical musician may realise that if she studies engineering, specialising in acoustic processing, she can work designing microphones and speakers. A girl who has always enjoyed computer gaming may realize, perhaps at a talk given at her school by games programmers, that the choices available to her after studying technology include a life spent writing games.

It is currently typical for young women to realize in their mid teens that a specific technology which interests them can lead to an interesting career. Girls usually have these moments of epiphany during a talk given in their school or during an outreach initiative conducted by a university. It is therefore absolutely vital to engage in outreach efforts to mid teen girls.

For example, Helsinki's Aalto University has organized summer classes in computer programming for girls aged 14-18, aimed at encouraging girls to apply for ICT degree programmes. TAF is also working together with Aalto to arrange visits to schools by successful female engineers; such role models are vital."

Do let me know what you think, and how we can encourage girls (and boys) to study more STEM (science, technology, engineering and maths) based subjects.

(The picture above is of Professor Marie Curie working in the laboratory of Paris university. Marie Curie and her husband, the French physicist, Pierre Curie, were the discoverers of radium and won the Nobel prize for physics in 1903. AFP/Getty Images)