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Connecting the dots to gain understanding

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Students will engage with science if they can relate it to their lives.

IT IS appropriate during National Science Week to ask the question: where will our next generation of scientists come from? I believe deeply in the power of science to transform our world for the better. But I am concerned that the number of students choosing one of the fundamental science subjects – physics, chemistry, biology and mathematics – at year 12 almost halved in the 1980s and 1990s. The consequence of this is that we now have fewer students ready to enter tertiary institutions with a knowledge of, or an interest in, science.

This translates into a less experienced workforce – not just in laboratories but in engineering, IT, pathology services, hospitals and other areas.

To reverse this decline and attract the next generation of scientists, requires an investment on a daunting number of fronts. We need more teachers and we need to provide professional development training to existing teachers.

We must provide better facilities, create inspiring activities, encourage parents who care, promote career opportunities and role models.

And we need to ask – do we do this at the primary or the secondary level, or both?

Outside of government, no one person or organisation can make progress on all fronts, so can individuals or non-government organisations make a difference? I believe so. The challenge is to pick the area where you think you can contribute.

I am a fellow of the Australian Academy of Technological Sciences and Engineering, one of Australia's four learned academies. As a national body consisting of successful career engineers, doctors and scientists, we recently decided to address the dual problems of how to train the next generation of experts and how to increase the level of science literacy in the community.

Our first decision was that we needed to work within the curriculum so that we could reach all students at a particular year level rather than being limited to those willing to give up their evenings or weekends.

Upon reviewing the international research on student attitudes, we were surprised to learn that a consistent problem in developed countries is that young people do not see the relevance of science in their lives, despite being surrounded by science and technology such as in medicine and even cooking.

We then asked, what do young people care about? A survey of 14-year-olds by the Australian Childhood Foundation found that — after you eliminate highly personal concerns such as losing a parent or being bullied at school — the top of the list of concerns for young people is growing up in a world without water and a world suffering from climate change.

In a poll by YouGov in Britain taken this year, 75 per cent of 16 to 24-year-olds surveyed "felt that it is important for them as an individual to do something about climate change".

From this we identified climate change as a handle, something with which to grab young people's attention.

Specifically, we chose renewable energy technologies such as wind, solar and biofuels as being extremely suitable for teaching the fundamental sciences.

So with the help of funding from the Victorian Government we started a program last year for years 9 and 10 students in four secondary schools, called the Science and Technology Education Leveraging Relevance program, or STELR for short. Based on its success we are running a larger program in almost 30 schools this year, and next year the Commonwealth Government has funded us to run the program in 180 secondary schools.

The program uses technology, in this case renewable energy technology, to stimulate the interest of students. It combines this with contemporary teaching practices, specifically inquiry-based learning.

We invest in the teachers by providing two days of professional development training. And we support the teachers by providing curriculum material and hands-on classroom kits consisting of solar panels, wind turbines and the ingredients for producing small quantities of biodiesel and bioethanol.

"Students learn to recognise the link between science and everyday life."

An important goal is to challenge the students to gather their own data and do their own literature research. They learn many skills, but if they learn nothing more than to make decisions based on the logic of the evidence in front of them I will be thrilled and proud.

The STELR program appeals broadly to boys and girls, to nerds and sportsmen, because it has a strong societal context. The first few classes expose the students to the extent of the problem of climate change, the difficulty of obtaining international agreement on corrective action, and the societal consequences and moral dilemmas caused by, for example, converting agricultural land from food production to biodiesel production. Then they use this understanding to work out how much solar energy is required to run their TVs, iPods and computers.

Students learn to recognise the link between science and everyday life. If we can offer every Australian student the chance to make those connections we will be well on the way to lining up the next generation of engineers, scientists, science teachers, medical technologists, computer experts, inventors, agricultural scientists and science journalists.

Dr Alan Finkel is chancellor of Monash University and a fellow and director of the Australian Academy of Technological Sciences and Engineering. On Wednesday he will speak on this subject at the National Press Club.