

The importance of Technology Education

How important is Technology Education to your school? Why is it so important? And what support is available?

2 Futureintech Ambassadors in action

The answers to these questions, and more, can be found in a new information sheet **Technology Education... the key to New Zealand's future.**

The info sheet looks at the challenges, benefits and opportunities facing a subject which is often underappreciated by schools and industry. It aims to provide a catalyst for schools to review the place of technology education in the school curriculum and add some clarity around the purpose and potential of Technology Education.

It's been developed by Futureintech in conjunction with **GIF – Technology Education**, the Government's major new initiative to support teachers and students involved in technology education.

Multiple copies of this info sheet have been sent to the Boards of Trustees of all schools in New Zealand.

The challenges

Technology education has been a part of the curriculum for 10 years now. Teaching graduates trained specifically in technology are slowly coming through, and a limited amount of professional development is available to teachers – but not enough.

Technology suites exist in many schools now, but too many are separated rooms where food technology, materials, and ICT rooms with rows of computers operate in complete isolation from each other, running against the very nature of the curriculum.

And some schools have been tempted to just re-label traditional programmes (such as woodwork and metalwork) as 'technology' without ensuring they actually reflect the values of entrepreneurship and innovation.

Overcoming the perception held by some that technology is not an 'academic' subject is another major challenge.

The benefits

At its best, technological practice extends the classroom – it takes students into the community, and into local enterprises. It can also bring community partners into the school. Partnerships with local enterprise can have a big role to play in developing important entrepreneurial skills.

Technological practice can be motivational and empowering for students. They are encouraged to take risks, show initiative, and take responsibility for their work. They learn to explore, research and begin the transition towards being independent learners, which is of life-long importance.

The opportunities

As well as the obvious example of Futureintech, a wider range of resources and programmes are becoming available for technology teachers and schools. For example, the government's **GIF – Technology Education** programme is providing \$6 million to boost technology teaching and learning.

Techlink is a joint initiative between IPENZ Engineers NZ and the Ministry of Education, with examples of best practice and resource materials available at www.techlink.org.nz.

Technology Education... the key to New Zealand's future

New Zealand needs innovators and entrepreneurs – people who can make a real difference to our economic growth. But they don't come along by accident. Education, and in particular technology education, is needed to grow and to nourish them.

Technology Education is about developing technological literacy so students can understand and solve technological problems. It's about finding unique ways of meeting needs and responding to opportunities, and as such it's a key way of promoting innovation and entrepreneurial skills.

Technology education has been a part of the national school curriculum since 1995 and compulsory to Year 10 since 1999. Implementing this new curriculum is a challenge for schools, but one that offers huge potential benefits.

This paper looks at the challenges, the benefits, and the issues facing technology education in New Zealand.

WHAT EXACTLY IS TECHNOLOGY?
 The Ministry of Education's 1999 curriculum statement defines technology as:
 "A creative, purposeful activity aimed at meeting needs and opportunities through the development of products, systems and environments. Knowledge, skills and resources are combined to help solve practical problems. Technological practice takes place within and is defined by, social contexts."

The curriculum statement describes technology as an age-old human activity. Our world is technological, and always has been – people have always adapted resources to meet their needs.

Almost every aspect of our daily life uses technology, for food, health care, transport, and entertainment. All students need an underlying level of technological literacy to play an informed role in this technological world.

Technological literacy is defined in the New Zealand Curriculum Framework, Technology Education Statement development as:
 "The aim of technology education is the development of student technological literacy."

Technology education provides students with the means to develop, an understanding of the nature of technology and evaluate and critique the effect of these on their own and others lives and environments. It allows students to develop technological knowledge, and participate in individual and group technological practice to better understand technology.

Students must be provided with opportunities to develop a broad technological literacy as they can participate in different classes in determining the direction of our future technological society.

For students to develop a broad technological literacy they must experience and acquire a wide range of technologies and diverse communities of practice."

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

THE BENEFITS OF TECHNOLOGY EDUCATION
For students
 Undertaking technological practice can be motivational and empowering for students. It allows students to identify, or be presented with, authentic needs, and creatively and analytically to identify, trial and evaluate potential solutions, and eventually put their ideas into practice.

This practice allows for diversity, fosters teamwork, and encourages interaction. It also develops the communication skills needed for collaborative research and work with people affected by the project.



INNOVATION AND ENTREPRENEURSHIP

Innovation is the act of creating something new and worthwhile, while entrepreneurship is the act of carrying an innovation to market in a commercial manner.

Innovation is a high-level creative activity that differs from improvisation (making do). Innovation can arise from accumulating and applying knowledge, but more often it is creative, arising from following intuition rather than conventional wisdom.

Development of innovative skills requires a supportive educational environment, and the technology curriculum provides it. Technology education is multi-disciplinary and about finding unique ways of meeting needs and responding to opportunities.

At its best, technological practice extends the classroom – it takes students into the community, into local enterprises. It may also bring community partners into the school.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

Entrepreneurial skills are about picking up and using innovation in a way that is commercially sensible. Partnership with local enterprise can play a big role in developing these entrepreneurial skills.

3 Futureintech Ambassadors in action

4 Futureintech news:
 • New CD-ROM
 • Virtual Lathe
 • Reach for the stars

Ambassadors in action

Futureintech Ambassadors are making a serious impact on schools around the country. These enthusiastic young professionals are a brilliant (and free) resource for teachers, able to inspire students and show them how subjects like maths, technology and science are used in real jobs.

Delicious innovation

Students at **Buckland's Beach Intermediate** have been learning about innovation and inventors with the help of Ambassador **Wendy Robinson**.

A Food Technologist at **Tip Top Ice Cream Company Ltd**, Wendy helps the company come up with new ice-cream products. She's been using examples from her work to show the students the different steps involved in product development.

Wendy was able to show the students an example of a brainstorm sheet they did at Tip Top for a possible King Kong ice-cream to coincide with the movie release. She then engaged the students in their own activity and everyone was stunned by the innovative ideas the students came up with!

Programming in Wellington

Computer programming isn't just about the technical skills – you need to be a real team player to be successful.

That's one of the messages students at Wellington High have been learning, thanks to Futureintech Ambassador **Scott Abernethy**. He's been working with Information Science students at **Wellington High**, who've been using Java programming to develop learning tools for teachers (their clients) to use.

Scott is a Software Engineer with **Stratex New Zealand**, and his session covered not just the technical programming language,



Wendy Robinson explaining to students at Bucklands Beach Intermediate how things work at Tip Top

but also workplace culture and the importance of teamwork in ICT projects.

It was a valuable learning experience for the students, and a chance to see how lessons learnt in school are used in real careers.

Studying the ruru

David Henry School in Tokoroa has used Futureintech contacts to enhance their school programmes.



A future young engineer from David Henry School.

With the help of Central North Island Facilitator **Margaret Brunton**, the school has enlisted a series of outside experts to help students with their technology project on the theme of the ruru (otherwise known as the morepork).

Jan Hoverd of Biodiversity Waikato has visited the class to explain the characteristics of the ruru, while a local engineer was arranged to help



David Henry school students with their ruru houses, designed with the help of basic engineering principles

the students build homes for the birds.

According to teacher **Emily Trainer**, bringing in an engineering perspective has meant that she (along with the students) now have a much better idea about what it is that an engineer does and how structures work.

Students have loved having new people in the classroom, and the school is now looking to use an engineer to help with their school-wide electronics and control theme.

Making connections with rural education



Dennis Wai and Rachel Barker from Fisher & Paykel at the Dunedin Futureintech Ambassador training day.

A trip to the West Coast, returning through the Mackenzie Country has made some valuable connections for Futureintech's Canterbury Facilitator **Neil Potter**.

Neil was impressed with the enthusiasm of the staff visited to get involved in the Futureintech programme. The main issue though is how to get the Ambassadors into the remote areas.

One possible solution could be the use of Westnet and Canatech video conferencing facilities – more on this after we discuss it with our Ambassadors and develop protocols, but Neil thinks it is an exciting possibility.

Creating a new gateway

Designing a better, and safer, entranceway to their school is the challenge for a group of Year 6 students at **Boulcott Street School** in Wellington. They've been tackling the issue with the help of Neighbourhood Engineer **Tristan Reynard** of GHD.

In their first meeting, Tristan

introduced students to the role of an engineer, showing them plans he's developed for a local BMX track, and the process he's undertaking to make it a reality. The next step is for the students to apply this new understanding to their own local challenge.

According to their teacher, the students have been inspired and haven't stopped talking about Tristan's visit.



Tristan Reynard answers questions from a captivated audience

Stay tuned for more info in the next edition of Enews, and remember to get in touch with Futureintech if you think your school could involve an Ambassador in your programmes.



Eleanor attended the Auckland Ambassador Training day in June, and has already talked to Year 8 students at Liston College about engineering as part of their careers day.

Ambassador Profile: Eleanor Marks

Process Engineer, Beca AMEC, Auckland

"Engineering is an opportunity to do something that doesn't just involve sitting behind a desk. It gives you a chance to get out there and explore things, which just makes it more interesting than the average office job."

"As a consultant I get to work in a variety of industries so I'm always learning new things. It also means I get to work on different types of projects with different people, which is fun.

"Process engineering is a big field because pretty much every finished product has gone through some sort of process. It's probably played a part in nearly everything you use, but you just don't know about it. I mean, have you ever thought about how toothpaste moves through pipes? Engineers solved that one.

"Problem solving is engineering to a 'T' really. You're always thinking 'how am I going to get around this, and can I do it another way?'"

"Away from work I like reading books, yoga, and going to movies. I used to ride horses but it's too expensive in Auckland!"

Futureintechnews

Kiwi physics

How much energy is in a car crash?

How do satellites get into space?

How do they stay up there?

If a sumo wrestler and a dwarf jump off a cliff, who hits the ground first?

The answers might surprise you...

Find out how the physical world really works with the help of Matthew Ridge, Marc Ellis and **Kiwi Physics**.

This new interactive CD-ROM, brought to you by Futureintech uses games, puzzles, videos and animation to show how physics knowledge can be applied.

The topics include waves, cars, satellites and bungee jumping, and you can meet people who've made a career out of using physics for things like surfboard design, astrophysics and police investigations.

Almost a year in the making, this great new resource for schools will be launched at a function later this month and made available to schools soon after.

Teachers will be able to request copies of the CD-Rom from Futureintech website or by phoning Doug Buchanan (04) 473 2023.

The CD-Rom was produced for Futureintech by CWA Learning Media.

A virtual workshop

Another great teaching resource on its way to schools is 'The **Virtual Lathe**', an interactive software programme giving students 'hands-on' experience with this fundamental workshop tool.

The Virtual Lathe has all the functions and controls of a normal



A page from Futureintech's new interactive CD-ROM *Kiwi Physics*

lathe, without the cost, space, time, noise and safety issues involved in using a real one.

Futureintech, on behalf of the Ministry of Education, has been working with Animation Research Limited to finalise the development of this innovative software.

The Ministry of Education is encouraging schools to use this initiative by providing professional development for teachers in the use of the software, its application and management within Technology Education programmes.

The Ministry is making the Virtual Lathe available to teachers who attend introductory workshops and will cover costs associated with these workshops including any teacher release. Letters are being posted to schools shortly with more details on the programme and the training days.

Reaching for the stars

Christchurch students have a unique opportunity in August to hear just how far a career in technology, engineering or science can take them.

Top NASA official Dr Jack Bacon is making a flying visit to New Zealand, and with the help of Futureintech and IPENZ, will be giving a free presentation for schools at the Christchurch Town Hall.

Dr Bacon will discuss his work on the International Space Station and Shuttle programmes, and NASA's future vision for exploring space.

This is literally a once in a lifetime opportunity – for more information and to RSVP contact Gijs Hovens at ghovens@skm.co.nz.

Contact Futureintech:

Tel 04 473 2023, fax 04 474 8933
enquiries@futureintech.org.nz
www.futureintech.org.nz