

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 1995 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 Essence 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 and engage with issues involved in technology.

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

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



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 enterprise. 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. Partnerships 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/or opportunities. They can then work 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 innovation. It also develops the communication skills needed for collaborative research and work with people affected by the project.



Students are encouraged to take risks, show initiative, and take responsibility for their work. They learn to explore, research and, above all, begin the transition towards being independent learners, a skill that will be vital long after school when they must self-learn new knowledge and skills to retain their employability.

For teachers

The introduction of technology education has encouraged teachers to develop teaching strategies based on contemporary learning theories. Teachers intervene as appropriate in order to support, guide, and challenge. Their knowledge and skills can be used to assist students in refining ideas, selecting and accessing resources (including from the wider community) and achieving quality outcomes.

In turn, these experiences often result in the development of innovative and entrepreneurial knowledge and skills for the teachers as well as their students.



BUILDING COMMUNITY LINKS

Technology education should provide genuine opportunities for students and teachers to interact in a mutually beneficial way with the wider community.

These interactions enhance and clarify classroom learning and give students an appreciation of the impact of technology on society. They also show the ways in which the values, ethics and beliefs of individuals and groups influence technological development.

The curriculum statement encourages teachers to make these links, noting that they are “important to a well developed, inclusive technology curriculum” (p. 17, Technology New Zealand Curriculum 1995).

CHALLENGES FACING THE TECHNOLOGY CURRICULUM

Technology education has been a part of the curriculum for 10 years. Teaching graduates trained specifically in technology education are now taking up teaching positions, and a limited amount of professional development has been available to practicing teachers.

However, with the rapid changes in this area it is essential that further and ongoing professional development is provided. It is important that more traditional programmes (such as woodwork and metalwork) are not just re-labeled as ‘technology’ without evaluation to ensure they reflect the values of technology education as outlined above. Similarly teaching support materials should be evaluated in terms of their usefulness.

Secondly there are the issues of physical space and the timetable, particularly in secondary and intermediate schools. In the worst cases the timetable has become an obstacle to rather than a facilitator of good education.

Technology suites exist in many schools now, but too many are separated rooms where food technology, materials technology, and the ICT rooms containing rows of personal computers operate in isolation from each other, implicitly contradicting the nature of the curriculum. Creative and efficient use of resources needs to include timetabling and planning for technology that acknowledges and validates this learning area. Resources should be provided to enable authentic learning experiences and the production of quality technological outcomes.

OPPORTUNITIES FOR TECHNOLOGY EDUCATION

A wider range of resources and programmes is becoming available to schools and teachers to help implement and improve the technology curriculum, including the following major initiatives.



Futureintech – a careers promotion initiative of Engineers New Zealand (IPENZ), funded by the Government via New Zealand Trade & Enterprise (NZTE). Futureintech supports the technology curriculum by getting young technology, engineering and science professionals into the classroom to help with exciting and practical projects. The aim is to inspire and encourage more students to take up these careers.

GIF – Technology Education is a \$6 million Government project to boost the quality and effectiveness of technology teaching and learning in senior secondary schools. A range of initiatives are being funded, including guidelines for developers and users of technology education resources, a hui for advisers and facilitators working with technology teachers, and Beacon Practice (see below).

Beacon Practice is the largest initiative so far to come out of the GIF – Technology Education project. Thirteen schools from around New Zealand with innovative technology programmes have been chosen to receive extra funding, professional development and industry support to further enhance their programmes. The results will be studied and made available for other schools to use and learn from.

Techlink was an NZTE-funded project to demonstrate the benefits of links between schools and the enterprise community. The website (www.techlink.org.nz) is now a joint initiative between the Ministry of Education and IPENZ and has case studies of best practice in technology education and resource material to support the planning and implementation of technology units

Sponsorship is an option for the funding and promotion of technological learning. In some circumstances it may be appropriate

