Focus

Trends and Developments in Technology Education

Sabbatical Report

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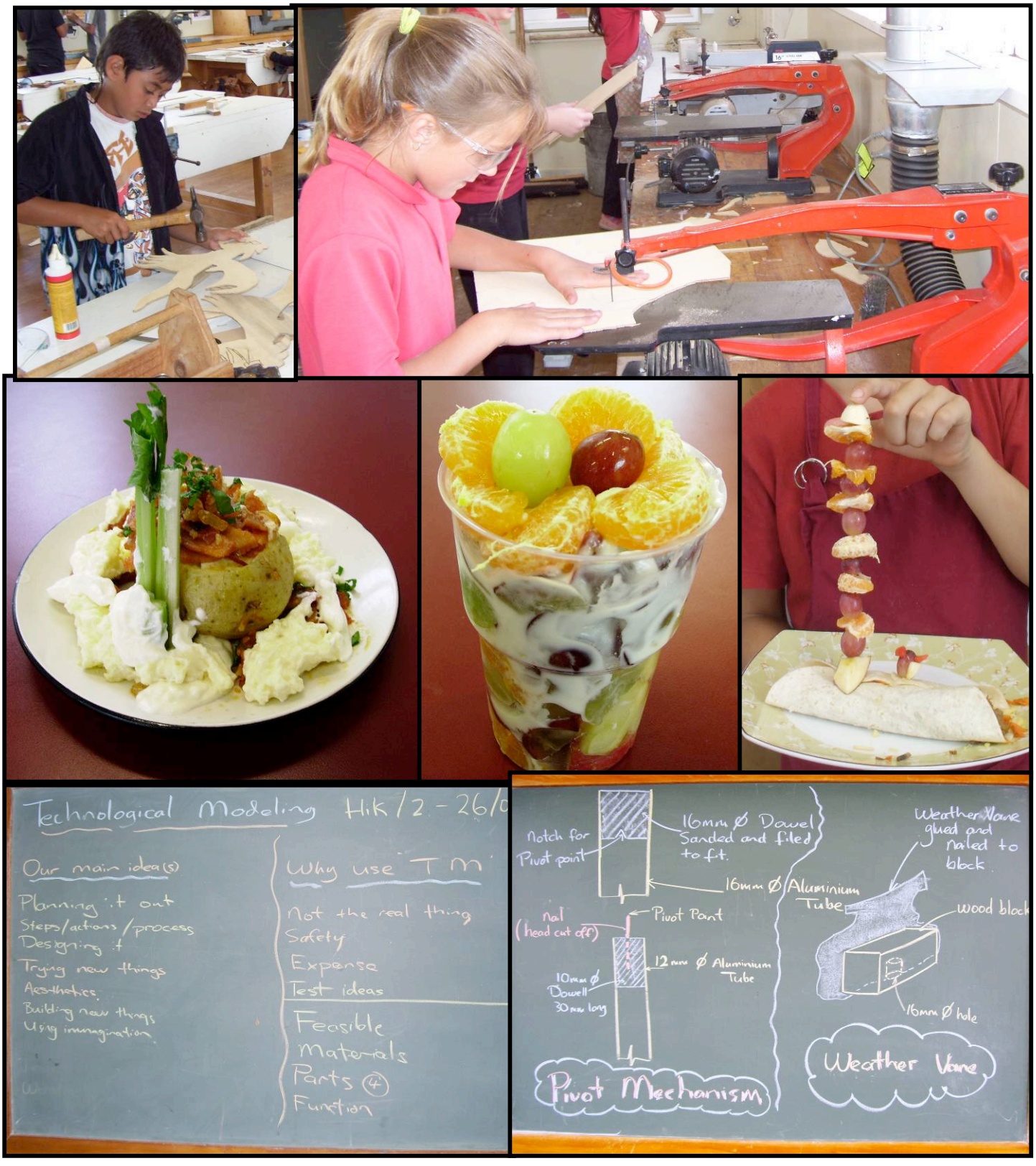
Hukerenui School Years 1-8
Term 4, 2008



Acknowledgement

I would like to thank the Hukerenui School Board of Trustees for their support and approval of my period of sabbatical. I would also like to thank all individuals and organisations who I conversed with throughout the period of my sabbatical and beyond for their generosity in terms of time, transport and sharing on a range of topics.

Thanks are also due to the Primary Principals' Sabbatical Award Group who provided me with this rich professional development opportunity and also with a much needed time of professional refreshment.

Sabbatical Purpose

The aims of my sabbatical were to:

- Investigate Technology environments and programmes in Canadian schools.
- To explore and compare international trends and developments in Technology which will assist us to refine our technological practices and improve teaching & learning for Year 7-8 students from our school and our client schools.
- Develop expectations of excellence in Technology

This sabbatical focus developed through our recognised need to make modifications to the delivery of technology in our centre. Over the last few years we have developed a strong focus to work with client schools to provide a technology programme that best meets their needs. There has been a shift in practice from the days of old where the 'one size fits all' model was applied to the teaching of technology. The sabbatical has provided opportunities to discover where exactly New Zealand fits within the world of technology, explore international trends first hand and bring back new ideas to implement into our programmes at the centre and the school.

Background

In 2006 the Ministry of Education, Whangarei Office worked with Hukerenui School to enable the attached technology centre to be stand alone. Previously the centre had been jointly managed and staffed between ourselves and another school in Whangarei. This opportunity allowed the school to develop with the client schools the direction of the centre; this has included modernisation, new buildings and equipment, professional development and a centre now staffed with primary trained teachers.

In 2007 the new curriculum saw the renaming of its three strands and eight achievement objectives (components of practice):

Strands	*Components of Practice*
Technological Practice	Planning for Practice
	Brief Development
	Outcome Development & Evaluation
Nature of Technology	Characteristics of Technology
	Characteristics of Technological Outcomes
Technological Knowledge	Technological Modelling
	Technological Products
	Technological Systems

Under the new curriculum schools no longer needed to provide learning experiences that covered four to six of the seven technological areas. Instead this new document:

'Gives students challenging and exciting opportunities to build their skills and knowledge as they develop a range of outcomes through technological practice'

Geoff Keith, Senior Advisor Technology MoE

For Hukerenui School this meant an opportunity to review our systems and practices, and reflect on the changes needed so we can best implement the new curriculum.

Methodology

Three approaches were undertaken to answer the research questions:

- Interviews with New Zealand & Canadian Principals / Heads of Technology
- Visits to New Zealand and Canadian Schools
- Research – New Zealand Technology Curriculum Support 2007 document, Ontario Science & Technology Curriculum Grades 1-8 Technological Education Grades 9-10 & 11-12.

Investigative Framework

The following questions were asked in one form or another in all interactions and formed the framework of the sabbatical investigation

- *How has the technology curriculum been developed & structured in Ontario, Canada? Are the same strands used? Is there one seamless curriculum that moves from Y1-13?*
- *What professional development is provided for the teaching of Technology?*
- *Are there specific designated teaching spaces for technology in Ontario Schools from elementary to High School?*
- *How are contexts for learning decided in technology? How are the local and student needs met?*
- *Do components of practice and brief development / design brief mean and look the same for Canadian schools?*
- *How does Information and Communication Technology (ICT) fit into the technology curriculum?*
- *What role do other educational providers and businesses play in developing Technology?*

Findings

It is important to stress that my investigation was not a rigorously controlled research project and therefore my report reflects a more informal nature.

It is a collection of my thoughts and impressions which I will use to assist our school journey in Technology.

The New Zealand Journey

The Head of Technology and I ventured south to visit three schools in the Auckland / Waikato area Term 3, 2008. Our aim was to see technology in action and look at ways technology was being implemented in these schools.

Key findings

Visual displays showing technological learning including photographs showing the stages of learning, learning intentions, success criteria and students evaluations & comments.

Integrated use of Technology with tools highly visible and integrated purposefully through learning programmes.

Use and development of the wider school environment to support learning programmes including technology e.g. worm farms, propagation, orchards, and herb gardens.

To need to have clear understandings of the skills and knowledge which needs to be developed over the two years when students attend technology at the centre so students can achieve at higher levels.

Effective ideas for layout and use of equipment

Issues faced by another technology were the same as we faced: timetabling issues, programmes offered, structure of the day.

The Ontario Way: High School Visits

My journey began in Sutton, Ontario, a small bedroom (commuter) community of 6,000 people near the shores of Lake Simcoe. Forestry and farmland also surround the town. Art Niezen the Executive Director of the Georgina Trades Training Inc. and former chair of the Ontario Council for Technology Education was my contact there. The non profit organisation Georgina Trades had grown out of a genuine need in the area. The Sutton schools identified that they were receiving the lowest scores on standardized tests in the York Region, students left for university leaving youth who didn't want to stay in education, and creating high levels of unemployment in the area. The community identified the education system was not meeting the needs of this 'at risk' group and recognised a real need to get people back into the trades. The York Public and York Catholics School Boards identified it was important to bring back hands on manipulative skills. Ministry policy provided flexibility for regional boards to meet their community's needs. This has been particularly important to a town like Sutton who has used forward planning to look at the changing needs of its community. The next few years will see the 404 (a main highway) extended all the way to Sutton. The impact of this has seen the community and schools look closely at the types of programmes they are offering so they will have the necessary skills and expertise locally rather than people coming from outside the community to fill these needs. The 404 will provide the community with a direct link to Toronto making it easier for people to work in Toronto but also enhance Sutton as a tourist destination due to its location near Lake Simcoe which is part of the Trent – Severn Waterway, a canal system which links together various lakes and waterways.

Art had organised visits to three different High Schools in the York Region District School Board – a regional public high school, catholic high school and large high school on the outer fringes of the Greater Toronto Area (GTA).

Art explained that Technology Centres like what we have at Hukerenui for Year 7-8 students had been closed at the elementary level. Regional Boards were faced with escalating costs of old equipment needing modernising and a huge government push to redirect funds to the national priorities of literacy and numeracy. This meant for elementary students their first links to Technology were coming at a High School level and many skills that students once came through to High School with were disappearing. What I did see was similar content and skills development at the first year of High School to what is delivered in our Year 7-8 programmes in New Zealand. The one exception to this was the Catholic School system whose first year of High School included what would be the Year 8 equivalent in New Zealand.

In Ontario the High School Curriculums for Grades 9-10, 11-12 is still to be released but course descriptors have been set for the 2009-2010 school year. The course descriptors for Grades 9-12 are set by the Ontario Ministry of Education.

The Ministry offers School Boards a wide range of courses which High Schools can select from to deliver in their school. Some courses have more of a workplace preparation focus while others prepare students for university / college. Areas include:

Computer Technology e.g. computer systems, networking, interfacing, electronics and robotics

Communications Technology e.g. TV, video, movie production, media studies, radio & audio production, print & graphics communications, photography, animation

Construction Technology e.g. plumbing, electrical wiring, masonry, carpentry, woodworking

Green Industries e.g. agriculture, horticulture, forestry, landscaping, floristry

Hair Styling & Aesthetics e.g. hairstyling, make-up, nail care, facials

Health Care e.g. instruments & equipment for health care, human anatomy, body chemistry, personal wellbeing, health care support services

Hospitality & Tourism e.g. food handling & preparation, event planning, customer service

Manufacturing Technology e.g. design & fabrication, lathes, welding machines, problem solving

Technological Design e.g. researching, designing, building, assessing solutions

Transportation Technology e.g. servicing & repairing of vehicles, aircrafts, watercrafts, being a vehicle owner

Key Findings

All three schools had specific areas designated for the teaching of Technology this included: cosmetology, fabric and design, hard materials room – wood workshop, workshop – cars and vehicles, kitchen, computer suite, health care / nursing. Spaces were organised into a discussion / classroom space with whiteboard, tables & chairs and then a practical work space i.e. kitchen / workshop / salon / restaurant.

Local needs were particularly important in determining the course selection for the different high schools.

Close links were formed with business through organisations such as Georgina Trades and in course structure where students were supported through an apprenticeship type model in their later years of high school. This allowed students to see if this was the area they were interested in as a career without investing lots of money through a Polytechnic or College and finding it was not what they wanted to do. It also allowed students to gain credits which held them in good stead when they left high school and completed further education / training.

Some high schools were more progressive than others. One school was more traditional in its approach to the delivery of technology and was still very project based, teachers did not move spaces or share resources. Another school looked closely at local needs bringing in aspects of skidoos, fishing huts and boats into their programme. This school also shared strengths of staff and integrated their curriculum areas. The shop teacher linked with the arts & graphics teacher to swap classes and teach a specialised component which furthered the others programme. This same teacher also swapped with the math's teacher to do the same.

Two of the high schools used their kitchens to cater for others – this included students and

the wider community. Students' involvement included authentic tasks of surveying students, putting menus together and cooking the food. Money generated from the meals cooked funded the staff involved in this programme. One school had its own restaurant which provided staff meals and was used to support the schools Arts Programme. The kitchen would cater for dinner to the public before shows put on by the Arts department.

The more progressive schools found barriers they had to overcome including timetabling especially when wanting to swap expertise to support another colleagues programme.

Students could talk about their learning but did not always use technological language. Often programmes started with students designing a prototype before moving through to a functional model. Contexts for learning were more teacher decided but through discussions modifications could be made to suit individual needs and interests.

ICT was a taught strand but most teachers I spoke to express a desire to see ICT linked more to their work area. They found timetabling issues made it difficult to get the computer lab when they needed it. Purchasing of software is decided at a Board level – teachers have input and can express interest in various software. The Regional Board makes the final decision as to where the greatest need is and what to buy. The same software is bought for all schools in that school district.

A 'train the trainer model' was a popular model used for professional development. One or two people would go to Board level training and then would come back to train other teachers from various schools in their area. The development of professional learning communities both in and across schools was seen as important and also included close links between elementary and high schools teachers in curriculum discussions.

In 2005 The Ontario Ministry of Education put together a series of resources called Think Literacy. This provides teachers with useful models to link Reading, Writing and Communicating to their subject specific technology areas.

'Ministry Speak' – Jill Snider

Jill Snider is the Education Officer for the Curriculum and Assessment Policy Branch of the Ontario Ministry of Education. She explained in Ontario there are one hundred School Boards. The Ministry of Education will set policy and it is then up to school Boards to sort priorities for their area.

Jill's background came from the Waterloo Region District School Board. She reiterated that up to 1998 some Elementary schools had Design and Tech and Family Studies rooms and students would be bused in from other schools for these programs. However in 1998 when the new science and technology curriculum at that time came out there was no funding for the areas above so many schools in the end made the decision to close these rooms. Some schools through community support maintained their Family Studies room with parents as volunteers taking Life Skills programmes. The Waterloo District School Board is an example of a Board that made the decision to create these rooms again for Grades 7-8 students. Technology for Grades 1-6 will still occur in their classroom with their teacher. An audit was completed of the rooms and if equipment in the room didn't support the needs of the new curriculum e.g. drill press or a band saw then it was removed. In schools where no Design and Technology room existed, one was constructed and equipped with portable tools and equipment. Other Regional Boards (Toronto and Peel) are now looking to move in this direction too.

Training is offered on an annual basis to make teachers feel comfortable in these environments; training is given for specific machinery but still some female teachers are reluctant to use the tools. Changing practice has been a challenge with teachers moving from a 'manual' focus to more of a technology focus - design, model and modification

process.

The revised Elementary Curriculum for Science and Technology for Grades 1-8 was released in 2007. In Ontario at an elementary level design technology is not a separate curriculum area it is linked together as Science and Technology.

Key Findings

The revision of the Science and Technology Curriculum has seen some of the following key changes:

- Reductions in the strands, number of topics and content covered allowing time for deeper understanding of the concepts and enhanced skill development.
- Increased emphasis on expectations relating to students' learning to science, technology, society and the environment. Links made to sustainability and the opportunity to explore and take action on environmental issues related to the products and practices of science and technology.
- Inclusion of Environmental Education expectations in every grade.
- Addition of big Ideas of Science and Technology, and their connection to Fundamental Concepts and overall expectations
- Linking Literacy and Numeracy skills to Science and Technology.

Formative Practice is at the forefront of these changes with teachers needing to understand the difference between assessment **of** learning and assessment **for** learning. **Assessment for Learning** involves the sharing of:

- Learning Goals / Criteria for Success
- Questioning
- Feedback – feedback to students; feedback to teachers to adjust instruction
- Self and Peer Assessment

Planning modifications shows the importance of:

- Linking Science and Technology Expectations with Language Expectations
- Linking the skills that must be explicitly taught so students are successful
- Identifying how you will know if the skills are acquired
- Identifying modifications that may be needed to support students

With the design of the curriculum being Science and Technology at an elementary level I sensed through discussions, teachers felt more comfortable with the teaching of Science and saw Technology as the 'and' part i.e. as a bit of an add on. RIGHT!! And the bit that is less well done!!

Independent School Visits: Stouffville, Ontario

Whitchurch-Stouffville is located 24 kilometres north of the City of Toronto with a population of approximately 24,390. It is a municipality in the Greater Toronto Area (GTA) of Ontario, Canada. The area is again classified as a 'bedroom community' where a large proportion of the population commute out to earn their livelihood. This is an area undergoing rapid growth as the GTA further expands out into the countryside.

Stouffville District Secondary School is replacement school opened in September 2007 to accommodate slow and progressive growth in the region. The school started with a roll of 850 students and is now at just under 1000 and has capacity for 1500.

Oscar Peterson Public School is located minutes down the road from the Secondary School and was officially opened in September 2008. It too is a replacement school as the previous schools' buildings and grounds became too small. The school is also a holding school for students who reside in the South Central area until their new school opens in 2011. Oscar Peterson operates an independently run Child Care Facility run by the YMCA and caters for students from age 4 to Grade 8.

Key Findings

Six elementary schools contribute into the district high school. A strong PLC exists where secondary and elementary teachers come together to exchange ideas and fill the gaps. Literacy is the strongest area where this happens. Administrators also meet together on a regular basis to exchange ideas and discuss needs.

ICT Technologies are prevalent in both schools. I visited Oscar Peterson in November only a few months after they had started and they were still awaiting a lot of their ICT equipment to arrive. Stouffville DHS has six smart boards, LCD projectors, a computer suite of 39 computers in their library and cross curricula computer labs on each floor, some classrooms had computers as well.

Professional Development is mandated by the MoE and the York board. Teachers are aware of the dates (5-6 a year) for professional development and schools are closed on these days.

At the DHS there was no specific literacy department every teacher was considered to be a teacher of literacy.

Implications for Hukerenui School – Where to from Here

The school is fortunate to have two staff members involved in the development of exemplars for the Nature of Technology and the Technological Knowledge strands. It is important for the school to utilise the knowledge gained by staff members and form a committee to review Technology at Hukerenui School

Some aspects to look at by the committee:

- A review of the structure and organisation of technology programmes at the Hukerenui Technology Centre including utilising the specific skills and strengths of other teachers both at the centre and in the wider school.
- A grounds development focus to further develop environmental education into the learning programmes at the centre including better using the environment and integration into the foods programme.
- Explore the development of a kitchen garden as out lined in Stephanie Alexander's book.
- Explore and strengthen links to both client schools and secondary schools – discussing expectations, forming common understandings and exploring local needs.
- Explore the use of mentors and businesses that could support technology and career development for students.
- Building upon our professional learning circles to include international links developed in Canada or other schools involved on the research project.
- Developing the role of literacy in technology
- Make formative practice a seamless part of technology and explore further research into best practice.

Conclusion

The sabbatical for me fulfilled the expectations I had. It gave me the opportunity for professional refreshment, a chance to read research, visit other schools and gain new ideas not only in the field of technology but in a wider educational sense. Thanks again!

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