



THE DYNAMIC INTERPLAY BETWEEN TECHNOLOGY AND SKILLS... LOOKING 20 YEARS INTO THE FUTURE

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Good morning

My name's Michael Frampton and I'm the Manager - Strategy and Corporate Relations at ETITO. ETITO is the organisation recognised by government and the telecommunications industry with statutory responsibility for

- providing leadership about future skill needs in the industry;
- designing national standards and qualifications; and
- managing the national training system that delivers the telecommunications industry with the skills that it needs for its future.

I'm here this morning to share some thoughts on the impact of telecommunications technology on skills training and human capability over the next twenty years and, more particularly, what that means for equipping the people that will deliver the future of your industry. I must say that it's something of a daunting task because while the future - even five years out - is unclear, what is certain is that businesses, individuals, engineers and telcos are conspiring to ensure that anything I cover today will in short order be either confirmed or rendered obsolete, so I shall speak quickly!



It's nonetheless a very important topic, because the people that you and your businesses are going to need to fuel the future of the industry are either already in the labour market, or making their way through the education system. In other words, skills matter and they're a priority for your consideration today.


Slide #1: The rate of change is accelerating...

A key driver of the rapid change to which I've alluded is the ubiquity and growth of telecommunications technology coupled with an exponential increase in available computing power. Moore's Law has held for the past 45 years or so, and there's no reason to think that it will end anytime soon.

From a social perspective, there are no indications yet that the ongoing penetration of these technologies into all parts of society, into all facets of our lives is anywhere near reaching its end. In fact, it's increasingly looking like a question of 'how far down the rabbit hole can we go?'

Slide #2: ... and technology is enabling a new learning paradigm...

I'm sure I'm speaking to the converted when I say that it's your people that drive your businesses. As managers, the acquisition and retention of good people should be one of your foremost concerns. This is because the success of your business stems from the quality of the people who are part of your industry and the skills they bring with them to work each day.



It's an exciting time to be working in industry training in New Zealand. While it's impossible to say with any certainty where we'll be in 20 years time, there's a new pedagogy [or theory of learning] emerging that is energising, and fills me with optimism about the future of skills-based education.

Previous conceptions of education had much in common with a factory assembly line. Learners entered the product line on a conveyer-belt, were 'subjected' to education that was hierarchical, top-down, divided into separate disciplines, and based around the communication of specific information from a set text. In this paradigm, the teacher was master and the learner was cast in the role of information recipient. At the conclusion of the learning process, 'qualified people' were tipped out of the production line and into the labour market.

The new model is looking rather different. The 'teacher-as-master' paradigm has been overthrown by a democratic push from the bottom. Learners are using the tools and technologies available to them to direct their own learning, and the teacher is being encouraged into the role of facilitator of learning. The new model of learning recognises the need to get out of the way and let learning happen. Rather than preach from a set text, the teacher guides learners through the range of texts available and equips them with the skills to direct their own learning. More important than teaching retention of specific information, is imparting the ability to use information – to source it critically, and employ it skillfully.



Moreover, this new model recognises the primacy of both the individual and the group. In this education revolution, ‘cheating becomes collaboration’, as it moves from an act of defiance to a creative and pragmatic solution facilitated by telecommunications technologies. It’s already the case that when you employ someone you engage their wider personal and professional networks. Into the future, employees will increasingly draw from their rich personal networks knowledge, opinions and ideas, with the genesis of many of these networks in the technology-enabled classroom.

Finally, this new model reappraises the importance of creativity. What previously belonged in the realm of the Arts is now having its place re-assessed in ‘hard’ subjects such as engineering and science, where divergent thinking is increasingly required to produce results. In this context, creativity is understood as the ability to imagine alternatives and solutions, and will be as essential in the future as literacy is fundamental today.

An excellent example of these principles in action comes from ETITO’s Bright Sparks Community. Back in 2000, we recognised that insufficient investment was being made to encourage students to enter technology careers in New Zealand. This led us to undertake a range of initiatives, one of which was the development of a web-enabled community for students with a passion for technology.


Tonight [and every night] students across the country will be logging on to our online Bright Sparks forum and exchanging information and ideas. They’re all working on



their own hi-tech endeavours – writing a software programme, building a small autonomous robot or designing a wind turbine to generate power. In doing so, they're gaining useful foundation skills that will aid them well beyond simply passing their next achievement standard. Skills that are more general, have more application, and ultimately – more value. Skills that are about overseeing an idea from conception through to execution, troubleshooting a difficult problem, sourcing and evaluating information, and collaborating effectively. We're also seeing the beginnings of entrepreneurial behavior – with one of our Bright Sparks even winning a special prize in the TIG's *Best Start-Up Competition* at the *Planet 2010 Conference* last year.

Success has largely come from relinquishing control, and instead seeking to influence the environment and the culture of the club in the role of facilitator, getting out of the way, and allowing the learning take place organically. Students are not only learning themselves, but are teaching one another in an informal, spontaneous process. The result is that the club as a whole is getting smarter – faster.

And how do we know that our intervention is successful? We know because Bright Sparks have taken a combination of first, second and third places at the prestigious Taiwan International Science Fair for the past three years in a row. We know because they've taken a similar number of awards within New Zealand. We know because the sophistication of the projects entered by club members has been rising with every year. And we know simply by logging on to the forum and watching the conversations unfold.




So what are some of the technology and telecommunications trends that will affect industry training over the next 20 years?

Slide #3: Web video is already changing the game....

Let's first look at the immediate term. Already, online video is a game changer. The increase in available bandwidth has - only relatively recently - reached the point where surfing the web exclusively for online video has become practical and affordable. And already, it's had a major impact on the way we access and assimilate information.

As *Khahn Academy*, *TED Talks* and similar initiatives become household names, we expect to see streaming online video making a significant impact on how people learn. This is because video allows us to experience contextual nuance that is unavailable through written text, through its engagement of both the visual and auditory senses. Simply compare the transcript of a speech to the experience of witnessing its delivery to understand the primacy of the direct experience. Indeed, human communication is fundamentally predicated on the depth, quality and synchronicity of exchange between individuals, which technology is re-acquainting us with after many years of addiction to text.

For vocational learning, video will continue to be of increasing value. Compare the reading of instructions about how to change a car's brake-pads to watching a five-minute online video demonstration on the same subject. Right now, training providers are only really dipping their feet in the water in this respect, as they develop the



courage and the organisational competence to fundamentally re-engineer curriculum based upon video, but I would expect high definition online video offering a rich learning experience to become a hygiene factor for industry training in the very short term.

Slide #4: ... and telecommunications technology offers much promise for further enhancing the quality of the learning experience...

One of the biggest constraints when we're looking at using digital technologies as a component in learning is the current state of the interface devices. Anyone who's tried to read a report from a computer screen will know what I'm talking about. And not everyone can currently afford an iPad to access their course materials from the couch.

However, we've already come a long way - from the old computer with a glaring CRT screen tucked away in the laundry with its 56k modem - to people surfing the web and engaging with digital content through their TVs, we believe it's reasonable to assume that interfaces will become more comfortable to use, more affordable, more portable and will allow for greater *depth* of experience. The convergence of devices will be a process in parallel, and learning resources will be accessed as and when needed.


We're not experts in technology or hardware, but with early hologram technology already being demonstrated, with 3D television hitting the home entertainment market, and with computer gaming, simulation and virtual environments becoming multi-billion dollar industries in their own right, it looks as though we haven't begun to approach the



limits in terms of a rich digital interface. The impact this will have on our ability to source, synthesise and catalogue information will be immense.

In the medium term, simulation is probably going to be the next game-changer for learning beyond online video. Indeed it's been demonstrating its educational value for decades as a standard part of pilot's training and - more recently - to train surgeons. The benefits simulation poses for learning are obvious. It allows the trainee to 'learn by doing' in a controlled environment that's free of consequences. Already in New Zealand, many industries are starting out the training of their future workforce using simulator technology. The result of this is that less time is required in the field with an instructor to gain the required level of competence and familiarity with the equipment. One of the significant bonuses of simulation is that it can provide feedback that far outstrips anything in the real world – due to the fact that every aspect of the environment is simulated and chosen aspects can be measured and fed-back into the trainee's results.

We're still coming to terms with the impact of many of these technologies on the world of teaching and learning, and you'd be forgiven for thinking that the introduction of technology as I'm describing suggests abandonment of everything that we do right now. I don't know that that's the case at all. If I may use an analogy, the introduction of the first records didn't replace concert pianists - we still go to see them perform. However, technology has meant that the options available to us for engaging with music have vastly increased. In other words, alongside the concert pianist is the DJ who is part-musician and part-technician. In a sense, this is how education is beginning to engage with these new technologies. There will still be classrooms,




teachers and students, it's just that the nature of these things, the relationships between them and the options they make available to us will change.

Slide #5: We're going to need a pipeline of talent to fuel the future of the industry...

I'm sure there's no one here that doesn't share with me a sense of optimism about the benefits that these advances in telecommunications technology represent. What troubles me is the question of whether or not we're investing sufficiently in preparing the technical workforce of today and tomorrow to make best use of them. I'm talking about the 'pipeline of talent' that will be necessary to innovate with and around telecommunications technologies. These are the engineers, technicians, and installers who will bring these technologies to life for the telecommunications industry and the businesses that rely on it. These are the people that will deliver on the promise that the technology represents. Moreover, they're likely to be the same people engaged in creating the demand for your technology - evangelising the benefits to Mum and Dad New Zealander of what might hang off the 5 megabit / second connection that will soon be available at their doorstep. In other words, the talent pipeline is about the people who give your firms a future.

Skills start with schools, and that's where ETITO's interest in the pipeline begins. As I've already mentioned, a decade ago we became concerned with the paucity of electronics subjects in schools. For many students, this meant they never discovered their knack for electronics – one that could have resulted in an entirely different career-path for them if only they had the chance to discover it for themselves.



As a result we developed an electronics qualification that could be delivered in schools. Right now at Years 12 and 13, around 2,000 New Zealand school students are engaged in ETITO's National Certificate in Electronics Technology qualification. Technology has now become a mainstream subject within New Zealand schools - not as a subject for academic underperformers, but as a legitimate pathway that will prepare students for a meaningful career.

We've been heavily involved in the development of the new Digital Technologies curriculum – writing achievement standards for the Ministry of Education for delivery in secondary schools throughout the nation. We've also been working in partnership with the Ministry to up-skill electronics teachers around the country. Moreover, we're working on national qualifications for technicians in your industry, modernising them to accommodate the dominance of fibre as we look to the future.

Slide #6: ... and ETITO is keen to partner with the industry to make it happen...

In short, we're doing everything we can to ensure that there are well-equipped people working in your industry and a pipeline of talented people headed in your direction. We are however, concerned that the average age of telecommunications industry engineers, technicians and installers is steadily rising, and the nature and number of people in the talent pipeline simply hasn't been keeping pace. Moreover, many of the people in the industry are part-trained, vendor-trained, or experience-only trained. In the context of the significant investment that we're about to make as a nation in the telecommunications sector, ETITO does not believe that sufficient attention is being paid to the people who will deliver the technology to the door and make it work.



Government makes a significant investment in ETITO to work in partnership with our industries to understand your human capability needs into the future; to design standards and qualifications that are well placed to meet those needs; to advocate on your behalf with universities, polytechnics, private providers, schools and government agencies for the kind of learning that you want for people working in – and destined for - your industry and the policy and funding settings that will best facilitate that learning.

We keenly desire to partner with you to equip your people for the challenges ahead and to attract new talent into your industry. My challenge for you as you speak with one another today is to consider what you are currently doing to ensure your industry has the skills it needs for the future. Our Chief Executive Garry Fissenden will be here all day, as will my colleague Tim Wake – both are eager to discuss how your contribution can shape and inform the work ETITO is doing around qualifications and skills for the telecommunications industry.

Thank you and good morning.

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