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Teaching Methods for the Technology Classroom”, and is currently publishing books entitled “The Critical Ontology of Technology” and “Technology, Religion, Spirituality and the Sacred”.

2020 Vision - on the politics of technology

Stephen Petrina

A dystopian view of 2020 or realistic pessimism?

Like this perhaps...

It's nightfall in 2020 and “The Clash” drones over the central monitors...

'London calling to the faraway towns...now that war is declared and battle come down.'

Smile, you're on 2020 'Tell-Lie-Vision' and every Slim Shady, Jr. you meet looks ominously white and passes any retinal exam that Scotland Yard and the Omni-Global Surveillance Network (OGSN) deploy. It is 2020 and we now recognize that they were in our classes and on our subways all along. How could we know?

'London calling to the underworld...come out of the cupboard, all you boys and girls.'

The fix we made on the future is now the fix we are in.

Will it look as envisaged by Dawid Michalczyk...? (See image 01, overleaf.)

In “*Neuromancer*” William Gibson writes *'Friday night on the Ninsei. He passed yakitori stands and massage parlours, a franchised coffee shop called Beautiful Girl, the electronic thunder of an arcade. He stepped out of the way to let a dark-suited sarariman by, spotting the Mitsubishi-Genentech logo tattooed across the back of the man's right hand'* (Gibson, 1984, p. 10).

In similar vein, *'United States patent number 5,945,577 was vigorously exploited by Advanced Cell Technologies, Genentech and Syngenta in the early 2010s and Mitsubishi's line of robots were perfectly sized for the biotech industry. While not entirely the “commercial ownership of humans” scenario projected into the future during the late 1990s, M-G's property rights claims on 17,000 gene sequences for their cellular processor implants basically control the fate of this new era of cyborgs'* (Haraway, 1997).

And the results of effective ICT education...

All the pirate cloners, hackers, downloaders and freeloaders are having a field day with the lawyers and legal counsellors. Every lawsuit, every litigation is an opportunity for the pirates and a node on which to swarm and propagate crime. ‘The Unknown Minor’ - remember her or him? - is still at large and dropped a bombshell in the copyright wars of 2017 by cracking and releasing the code to “*The Borderliner's Cookbook*”. Recall that the automated “*B's Cookbook*” was rescinded and outlawed in 2014 when the Depression Matrix Squad busted a ring of juveniles sabotaging master security feeds in Amsterdam, Johannesburg and Sydney.

01

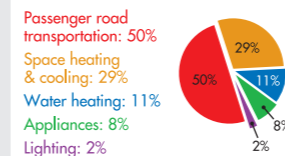
01 "Suburbs 2100".
© Dawid Michalczyk,
www.art.eonworks.com



02	04
03	06

02 Emissions in Canada.
(Developed with information provided by Environment Canada.)
03 Smog over Toronto.
04 Renewable energy technologies.

PERSONAL GHG EMISSIONS FROM ENERGY USE IN CANADA



It is 2020 and the conceptual safety nets we once cherished have all but failed. Rosy as they sounded, they rang hollow...

G?

Should students in design & technology courses be formally involved in futurism and technological forecasting activities? Why or why not? Do the risks of futurism outweigh the benefits?

The recent past may not bode well for future education...

Lifelong learning, the darling of educators for over thirty years, began her demise in October 2001, when the BBC broke the news on the Individual Learning Accounts (ILA) scam, affecting 1.2 million 'students'. Recall that the ringleader, Ferrari Nick, and dozens like him bilked the British government out of the equivalent of \$169 million by cashing in on lists of bogus 'students' enrolled in dream courses: Chronic Cats 2001, Creative Writing, Learn to Draw and Paint, National Powerboat Certificate, Exercise to Music, Transcendental Meditation, Summer Glastonbury 2001 and Crystal Healing. As Secretary of State David Blunkett confessed at the time:

'As well as galling, the failure of ILAs struck a devastating blow to' the dream of lifelong learning. It lasted but a generation.

Has a grand fallacy been luring us to our doom?

All these quaint, inflated hopes were hitched onto that grand fiction of sustainable economic growth, which we now realize was bad psychology at best. The neocons, with their "Project for the New American Century", deferred the depression into the future for two decades but then it hit, not suddenly but hard, in 2011. The grind of the economy to that moment was excruciating. We look back with amazement, wondering why we were so gullible and impulsive as we climbed and matched personal debt with national debt, pound for pound, yen for yen, dollar for dollar. Kondratieff (economic cycle) analysts predicted the depression but there was not much anyone wanted to do. There is no one left to blame, as most of the spin-doctors comfortably spun their way out of the mess, retiring to the gated compounds on the islands and in the southwestern United States. Rethinking a collapsed world economy is no small feat and only Africa is in a position to offer anti-capitalist options to global economics. Remarkably, although it is what Rachel Carson (writing "Silent Spring" in 1962) anticipated, the environment is recovering and there are reports of the Amazon choking off roads, abandoned timber trucks and backhoes, reminiscent of the jungle's stranglehold on ancient temples in Tibet. It is nevertheless very hot and biohazards threaten corporate food supplies.

It is 2020 and the next generation is in the driver's seat. Who are the new teachers and what do they think? What were they thinking back in 2006? And what ever happened to design & technology?

G?

'It's not about the world of design, it's about the design of the world'.

This was the rallying call of the International Council of Societies of Industrial Design (ICSID) in 1997. What does this mean for design and technology educators and students?

On the politics of technology

Here in this moment, someone's 2020 vision is taking us somewhere into the not too distant future. Thatcher's 'Free Enterprise' and Blair's 'New Labour' visions directed Britain in two directions toward the future, although many argue that the destinations were the same. Currently, the "Project for the New American Century" is failing in the world, but neocon futurists never seem to be short on vision. The politics of technology have never been more important, and it does not matter how you define politics - political party vision, policy, parliamentary procedure, realpolitik, activism, anarchism, libertarianism,

authoritarian might, oligopolitical rule, agendas, power, stakes, values, or interests. Take your choice, whatever your definition of technology will be crucial.

With 2010 visions, British and Canadian governments signed the "Kyoto Accord", the international treaty that somewhat binds countries to reduce the amount of greenhouse gases they emit if their neighbours do likewise. Yet CO₂ emissions in both countries have increased since the late 1990s and both governments have failed to stand behind their legislation and policies for reducing greenhouse gases to 2010 targets. The "Renewables Obligation" is aimed at increasing Great Britain's renewable energy production to 10% of the total by 2010. Canada's "One Tonne Challenge" called on Canadians to cut greenhouse gas emissions by a tonne per year by taking public transit more often, composting food waste, and adopting energy-saving devices such as programmable thermostats.

The "Renewables Obligation" is now the Labour party's agenda for nuclear power, and the "One Tonne Challenge" was revoked in April 2006 by the Conservative party. The United States government did not sign the "Kyoto Accord" and its newfound interests in nuclear power are a factor of backlash from dependencies on the Middle East's oil. Global warming policies are great examples of the politics of technology, where politics are understood to be governmental and legislative.

Q

Convenience in design comes at a high price. 'Massive Change' is a movement dedicated to helping us rethink convenience and consumerism.

What is the duty of the designer in today's world? What is the future of the designer? Of design?

Yet, politics extend far into the informalities of education, technology and everyday life. And obviously, no-accounts like Ferrari Nick have their own form of politics that exceed or counter more institutionalized forms of parliamentary politics. Similarly, customers, users and students generate forms of politics to finesse both governmental policies and the Ferrari Nicks of the world. Indeed, for our purposes here, politics are best understood as 'interests', whether the venue is education or technology. Interests in this case refer to connections or commitments to particular causes and outcomes, and the influence necessary to pursue and shape these causes and outcomes. Hence, interests cannot be reduced to 'special interests'. More and more, in the design and use of technology, various interests are colliding. Think of some of our more familiar technology cases where commercial or private, governmental

and public interests collide - greenhouse gas regulation, open source, P2P file sharing, surveillance and security and mobile computing are just a few.

Or think of some common controversial issues in design and technology: acid rain, alternative medicine, artificial life, industrial cancer and risk, CFCs and the ozone, crime and DNA identity checks, deforestation and jobs, disease and treatment, GMOs, habitat preservation, microchip implants, organic farming, privacy and the internet, racing, recycling, rights and new media, SUVs, wildlife management, war, and global warming. The issues are made controversial through competing interests.

Or think about a technology that you will be dealing with in the schools, such as a hammer, microprocessor, plastic tubing, mp3 file, CAD application, or CNC router. Are you prepared to teach both the 'applications' and 'implications' of this technology? Can you demystify it and resensitize your students to its political implications? Are you familiar with the politics of this technology? How will you prepare resources that deal with the politics of these specific small 't' technologies as well as big 'T' Technology? See for example the writings of David Barlex (2006); Steve Keirl (2006); Helen Kennedy (2005); Margarita Pavlova (2005); Kay Stables and Richard Kimbell (2001).

The small-time Ferrari Nicks and big-time neocon visionaries of the world want to make

a bigger, easier and faster buck by finessing consumers and markets while governments respond with regulations and policies to govern use, consumption, waste and the flow of commodities. At the same time, the average Joes and Josephines want technologies to work or work differently, easily, ecologically, effectively or equitably. Things get more confusing when our public institutions favour the protection of corporate interests, or commercial interests preclude a consideration of the interests of the average citizen. We are currently witnessing this convergence of the public and the corporate on a grand scale. Corporate governance always refers to governance *in* the corporation and governance *of* the corporate interest, which quite often conflates with the public interest.

What roles are accessible to the average citizen's abilities and desires to participate in technological decision-making, or corporate governance over the public interest? What avenues are available for the average citizen to express their interest in shaping their technological futures? And what nodes of the life cycle of technology ought we to leave open to participation and intervention? Resource acquisition and extraction stages? Design and innovation stages? Diffusion or implementation stages? Recycling and waste disposal stages? At what scale or scope ought participation to be granted? What methods can we deploy to facilitate participation? Is representation or proxy good enough? Is 'consultation' good enough?

Of course, these are the questions we ought to ask of our students' participation in all facets of design and technology.

If particular interests are included and other particular interests are excluded at every node in *forecasting, designing, creating, using, maintaining, managing, regulating, assessing and recycling technologies (information, products, processes and services)*, then it is easy to conclude that, as Langdon Winner (1980) did, '*artefacts have politics*'. Is it the case where someone else's interests are invariably inscribed in these activities? Do my or your interests ever have a chance? To be sure, some artefacts, designs, infrastructures or technologies offer different ways of being in, or interacting with, the world than others do. Bicycle or electric vehicle transport offers a much different relationship to the world than does a petrol-powered 23cc truck. But Winner, a philosopher of technology, reminds us that all artefacts have politics - they are a proxy for someone's interests or delegated to express our interests while we are out and about.

Technology or technologies is/are not politically neutral, although this is what many corporate advocates would have us believe. As if on cue, when Bill Gates, Microsoft's founder and CEO, was recently asked by talk show host Donny Deutsch whether new media were reinforcing crass individuality and anti-social behaviour in young people, Gates (2006) spun the question:

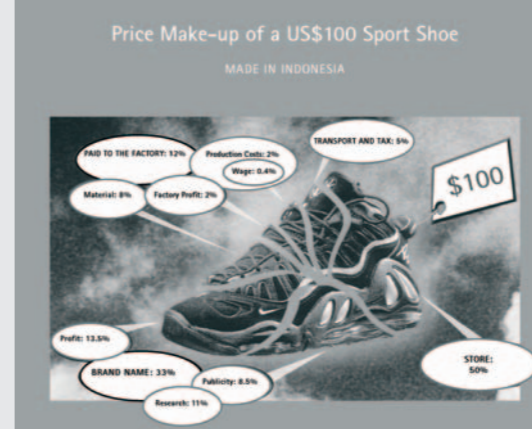
07 08

07 Engineer inside black box.
08 Citizen outside of black box.
(Illustrations 07 & 08 © Simon Minter. Adapted from Kline, 1995, p. 181.)



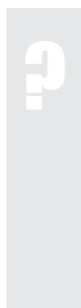
09

09 Inequities in shoe design & production.
(© The Clean Clothes Campaign.)



'Technology is just a tool' he answered, 'to let you do what you're interested in... It's an enabler'. All technologies may not embody a well-defined political agenda, but nor are they neutral instruments of 'progress', or neutral enablers, as Gates would like us to believe. Yet if we open up, disassemble or deconstruct these artefacts, designs, infrastructures or technologies, will we find someone's politics or interests? Winner (1993) says most of these 'black boxes will basically be empty, devoid of any profound democratic interests'. Artefacts are often called 'black boxes' because most of us do not know how they work or what is inside, which creates a power differential between those who know and those who do not. Other analysts call the entire process of design or technology a 'black box' because we do not typically know how to gain political access to design or innovation processes. This generates power differentials between those with access and those without. The typical criticism is that engineers or designers have access but see only what is going on inside the black box while the rest of us are denied access but have a good idea of what is going on outside the black box. Their interests are included while our interests are excluded. The average citizen does not know how things (artefacts, design, politics, technology etc.) work; we just know that certain things work for some better than others. Does it not seem as though corporate interests are invariably included within the black boxes? What are these corporate interests (e.g., control and expansion

of markets and profits, convergence of services, displacement of labour for capital, mass consumption, planned obsolescence in products and services, proprietary regulations, surveillance of mobility)?



Think of a technology (device, infrastructure, machine, tool, system etc.) that you want to redesign. What advantages accrue through a transparent public design process? What are the limits, if any?

Joel Bakan (2004) argues that when corporate interests dominate our designs in and on the world, the average citizen learns apathy and helplessness while the world travels down the dangerous roads of fascism (Bakan, 2004). In the late 1990s, when Nike products dominated the recreational sports landscape, Phil Jackson, the company's CEO, grew nervous about masses of people saluting what critics called the Nike swooshtika. He also feared brand dilution in a volatile market. The dominance of corporate interests has its costs, some hidden and others visible; some collateral, others deferred. Naomi Klein (2000) has noted that the politics of Nike offer an exemplar of the politics of technology (and see also my own writing, Petrina, 2000). On one hand, Nike influences the politics of design by offering a model for other designers

to emulate (i.e., brand loyalty, cool hunting, fashion ranging, hyper-marketing, sweatshop labour). On the other hand, Nike co-opts its consumers' interests into unsustainable material resource streams and exploitive practices as noted in the poster produced by The Clean Clothes Campaign.

When we kick a football or watch the World Cup we are implicated in a politics of technology extending from the soccer fields of Leeds to the sweatshop factory floors of Thailand, where the football leather is cut and sewn. When we buy a Barbie, two every second across the world, we sanction Mattel's sweatshops in China, where wages are £1.50 per day and conditions are stifling hot. As we involve our students in design, we can also involve them in global movements to monitor, regulate and improve these conditions. The Labour Behind the Label coalition, Clean Clothes Campaign and Maquila Solidarity Network offer political avenues, strategies and instructional materials for contradicting exploitive practices in the world of design. What options do we have?



There is little doubt that designers at the cutting edge of technology produce highly innovative and desirable items. Yet some of these products are manufactured under some of the worst

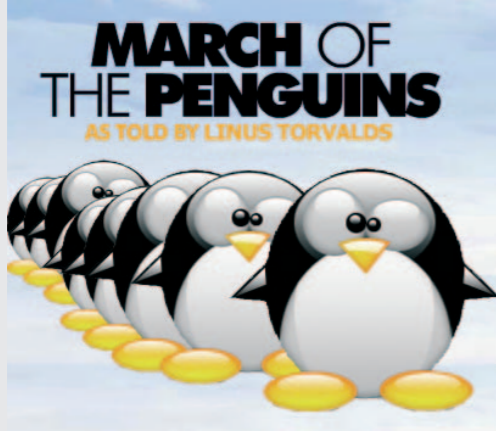
sweatshop conditions in China. What are the designers' obligations toward ethical production or a more publicly-informed design process?

2020 Vision: The sources of production

Karl Marx argued that political changes come through controlling the forces of production. Of course, seizing the forces of production - the technologies and materials of production or what Marx called Produktivkräfte - is not so easy. Alternatively, liberals argue that political changes are made by regulating the state, by effectively controlling governmental intervention, which again is never easy. Fascist governments typically invite and accommodate a large amount of corporate control of both the state and the forces of production. This is a lethal combination.

But there is something more profound to control, something that Marx overlooked or could not foresee, and that is the sources of production. And at this moment in time...

A spectre is haunting the matrix - the spectre of open source. Global powers have entered into a desperate alliance to defend markets



10

10 Open Source marches on.
http://creativecommons.org/licenses/by/2.0/deed.en_GB

and property rights from this spectre. The music recording, motion picture and video industry, software giants, big media, corporate commerce and neoconservative politics have converged, once again, to assert control over the forces of production, and by implication social relations and culture. But as the likes of Monsanto are discovering, it is much easier to control the water fountains than the water.

If the forces of production involve your physical labour, the sources of production involve your intellectual labour - your 'intellectual property' or 'intellectual work product' in capitalists' terms, and all the rights and access you may or may not have to this property or work product (Petrina, Volk & Kim, 2004). How much longer can the sources of production be controlled? 2010? 2020? Open source and its counterpart, open access, provide a politics of technology that every design and technology student and teacher can and ought to embrace today. That is as true for this generation as the next, tomorrow, through 2020.

Open source or FLOSS (Free/Libre Open Source Software) is about freedom, and like open access, about sharing. Freedom in this instance means that we have *freedom to access*, change, share and transfer the source code of open source software, *freedom from* the legal and disciplinary constraints of proprietary software, and *freedom to* download and share open source software and other forms of data (e.g., audio, text, video) without financial

exchanges. Open access means that we have *freedom to* access, store, print and share information, be it public or private domain (Willinsky, 2006). The key to both open source and open access is open, universal file formats and open, shared information. Hence, open source and open access fundamentally concern liberties and rights (Petrina, Volk & Kim, 2004).

Linux-based, open source operating systems have been tremendously successful, considering the control that proprietary companies have over the sources of production. Linux-based server operating systems now represent 30% of the global market and Apache web servers have increased to 62%. Microsoft Windows still dominates the desktop systems of the world (93%) but Linux is now cutting into profits and have increased to 4% of the global market. Firefox is also quickly displacing Microsoft Explorer as the most commonly used browser in the world. Corporate control of software is now seriously threatened by FLOSS's "March of the Penguins".

Teachers ought to be interested in adopting open source and open access philosophies and there happen to be very good pragmatic reasons with regards to design and technology software needs. Pragmatically speaking, 2D drawing applications such as Cascade and QCAD, graphics applications such as Inkscape and The Gimp, 3D applications such as Blender, video editing applications such as

Jahshaka, Audacity for audio editing, Moodle for course management, and suites such as Open Office are outstanding open source options for design & technology teachers to adopt. By saying no to proprietary control over the sources of production you say yes to freedom and a democratic politics of technology that is healthy and progressive. And by saying yes to open access and yes to the freedom of information and the free circulation of ideas, you say no to elitist, monopolistic and oligopolistic control of knowledge.



Have you used open source software in your teaching? If not, why not? And if you have, how did it compare with commercially available software?

Every time you make a choice, whether it is over food, football, shoes or software, you are implicated in the politics of technology. The choices this generation makes establish the conditions the next generation faces. Our choices at this moment are necessarily about sources of production and sources of life - choices we will hopefully still have in 2020.

Ocularism aside, what is your 2020 vision for design & technology?

References

- Bakan, J. (2004). "The corporation: The pathological pursuit of power". Toronto: Penguin Canada.
- Barlex, D. (2006). 'Pedagogy to promote reflection and understanding in school technology courses'. In J. R. Dakers (Ed.), "Defining technological literacy: Towards an epistemological framework". (pp. 179-196), New York: Palgrave MacMillan.
- Carson, R. (1962). "The Silent Spring". Now available from Mariner Books, Houghton Mifflin, Boston, MA., USA.
- Gates, W. (2006). Interview in "The Big Idea", 9 May.
- Gibson, W. (1984). "Neuromancer". New York: Ace Books.
- Haraway, D. (1997). "Modest witness @ second millennium: Femaleman meets oncomouse". New York: Routledge.
- Keirl, S. (2006). 'Ethical technological literacy as a democratic curriculum keystone'. In J. R. Dakers (Ed.), "Defining technological literacy: Towards an epistemological framework" (pp. 81-102). New York: Palgrave MacMillan.
- Kennedy, H. (2005). 'Subjective intersections in the face of the machine: Gender, race, class and PCs in the home'. "European Journal of Women's Studies". 12. (4), 471-487.
- Klein, N. (2000). "No logo: Taking aim at brand bullies". Toronto: Knopf.
- Kline, S. J. (1995). "Conceptual foundations for multidisciplinary thinking". Stanford: Stanford University Press.
- Pavlova, M. (2005). 'Knowledge and values in technology education'. "International Journal of Technology and Design Education". 15. (2), 127-147.
- Petrina, S. (2000). 'The political ecology of design and technology education: An inquiry into methods'. "International Journal of Technology and Design Education". 10. (3), 207-237.
- Petrina, S., Volk, K. & Kim, S. (2004). 'Technology and rights'. "International Journal of Technology and Design Education". 14. (3), 181-204.
- Stables, K. & Kimbell, R. (2001). 'Technology education in South Africa: Evaluating an innovative pilot project'. "Research in Science Education". 31, 71-90.
- Willinsky, J. (2006). "Access principle: The case for open access to research and scholarship". Cambridge, MA: MIT Press.
- Winner, L. (1980). 'Do artifacts have politics?'. "Daedalus". 109. (1), 121-136.
- Winner, L. (1993). 'Upon opening the black box and finding it empty: Social constructivism and the philosophy of technology'. "Science, Technology & Human Values". 18. (3), 362-378.