

**50 years back and forward:
Lessons learned from a lifetime of using 'cutting edge' technologies
for learning and research.**

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The patron saint of all of us at this conference, the Canadian futurist and philosopher of media, Marshall McLuhan, famously said: "We shape our tools and thereafter our tools shape us." His point was that a major agent of social and environmental change is technological change. Through a process I have tried to understand and use as a basis of my futures work, new technologies allow new behavior. New behavior challenges beliefs, values, and institutions that are based on the old behavior of old technologies, and eventually creates new beliefs, values, and institutions. Thus technology is a major source of social change--and conflict.

As a futurist, I have to follow closely the diffusion of existing, and the development of new and emerging, technologies in order to anticipate future behaviors, beliefs, values, and institutions, and their interrelationships.

I learned early on that what we "know" and how we communicate our knowledge, depends on the models and media we use to observe the world. I learned this first and very vividly when I struggled to teach political science in the Japanese language for six years at Rikkyo University in Tokyo when I was a brand new PhD.

The world embodied in the Japanese language is totally different in many ways from the world portrayed in English. I was literally a different person when I was speaking Japanese in Japan from what I was before coming to and after leaving Japan, speaking English. I am much more direct and forceful and clear in English, and the world is full of egoistic agents causing things. But I am very vague, participative, and involving in Japanese, where things happen but no one seems to cause anything to happen.

English is full of nouns and pronouns, while Japanese is all verbs, adverbs and adjectives.

Which is the real me? It depends a great deal on the language I use.

After leaving Rikkyo University, I went to Virginia Tech for three years, in part to teach mathematical applications in Political Science, because I had come to realize that math is

a much more precise way of communicating than are mere words. But in fact, I fell under the influence of architects and artists while I was there, and became seduced by the emotive power of visual images in comparison with the cold logic of math models, and I began experimenting with visual, three and four dimensional, modes of perceiving and communicating ideas.

It is not enough just to study the effects of new technologies on behaviors and beliefs. It is also necessary to try out new technologies for ones self and to experience the changes, and the resistances to change, in one's self. So I have always tried to be an early adapter of new technologies of all kinds in my teaching and presentations in order to feel and not just to know what is going on.

It was also at Virginia Tech that I introduced what is said to be the first officially-approved university course in futures studies in 1967. Teaching futures studies meant I had to look carefully at how all kinds of technologies had influenced society in the past and present, and anticipate how new technologies might influence the futures.

When I started out as a futurist in the 1960s, that meant especially that I had to track changes in transportation technologies. I studied the social and environmental consequences of moving from horses and sailing ships to steam ships and trains in 19th c; and then to automobiles and airplanes, and from propeller- to jet-driven airplanes over the 20th C.

But strangely, there has been no significant change in transportation technologies on or near Earth since jets in the 1960s (and the 747 in 1970s). Almost all of the action since then has been in communications technologies. Will that continue into the future, or are communication technologies reaching a peak and about to be surpassed by something else?

I went to Hawaii in 1970 specifically to teach futures studies, and have done so since then. In 1972, when I attended an East-West Center Communication Institute International Conference sponsored by Jim Richstad and Stan Harms, Wilbur Schramm--then the grand old man of communications theory--told the audience not to expect any major new developments in communication technologies--everything had already been developed. I was skeptical and suggested some changes in a piece titled "Some possible new communication technologies," that appeared in the proceedings of the conference: Jim Richstad and L. S. Harms, eds., *World Communication*. East-West Center Communication Institute, 1973.

And boy was Schramm wrong. McLuhan had already said that TV was going to revolutionize society. The word was out, the image was in!

So I produced a TV show on KHET, the local educational television station here, called "Tune to the future". I based it on the style and timing of "Laugh-in" and "Monday Night Football." Even though it won a national prize, I knew I didn't know enough about communicating in moving images, so in 1974 I went to Canada--to TV Ontario, the main

educational TV station in Canada-- to learn how to produce enticing and informative educational television programs.

I believed that TV was clearly the wave of the future. We were moving from literacy to mediacy, I was certain. When I returned to Honolulu, I began teaching media literacy classes at UH, encouraging students not to write papers or dissertations, but to video the concepts--with Sony Portapak being the high tech video medium of the time.

One day in 1976, a colleague, George Kent, dropped by my office and told me to come downstairs and see a demonstration of a Wang word processor.

"A what?" I said. "A word processor", he replied.

"How in the world do you 'process' 'words'?", I asked.

I was amazed by what I saw--all that cutting and pasting was truly impressive--but I didn't understand its power. I still believed visual literacy would win. But I was totally wrong this time.

Wang and his fellow travelers set back visual literacy at least 50 years. Though Apple, and now the iPhone, iPad, Youtube and the rest seem to be restoring visuality, we are still way behind where I thought we would be by now, all because of Wang and the PC.

Nonetheless, it was the personal computer that changed my adult life more than anything else. In 1976, Murray Turoff of NJIT invited me to join EIES--the Electronic Information Exchange System. I was probably the first civilian in Hawaii to experience what became the Internet, originally through a Texas Instrument keyboard and modem that had no memory at all.

Suddenly, it didn't matter that I lived in the most remote spot on the globe. With the Internet and the jet plane I could live anywhere and still be totally connected with everyone. In the twinkling of an eye, my world changed.

Later I moved to a Radio Shack 100 and then 200 with its increasing memory and built-in modem. I also brought the first Apple One to the Pacific island of Saipan in 1980, in the hope of convincing them not to build a library full of paper books and journals for their new community college, but to access all knowledge electronically and remotely.

They built the library, and sent me home.

Now of course digitization is sweeping world. Google, Kindle, and iPad are marginalizing libraries and paper.

Several months ago, I was invited to participate in a conference on the future of the book at Paju Book City--a new city in Korea devoted entirely to the production of paper books.

I have spent a great deal of time in Korea in recent years at various research centers that focus on developing new electronic communications technology. I have been enormously impressed. Indeed a Korean colleague, Seo Yongseok, and I wrote a paper a few years ago proclaiming that Korea is the first Dream Society. That paper has been reprinted widely, and everyone in Korea is begging me to talk with them about Korea as a Dream Society.

The basic concept, which is not my invention, is that just as societies have moved from hunting and gathering, to agriculture, to industrial, and to information societies, so now the next era is what I call "a dream society of icons and aesthetic experience."

According to a flurry of books by Ernest Sternberg, Rolf Jansen, Virginia Postel, and Daniel Pink, increasingly the way to be rich and famous is not to produce food, products, or even information. That is passé. The way to be rich and famous in the future is to produce dreams. Educational systems thus need to encourage people to be creative dreamweavers and not boring knowledge workers.

What I have added to this discussion is to identify Korea as possibly the first official dream society, since Korea is the first and so far only nation whose government specifically bases a significant part of its GDP on the production and export of popular culture--movies, soap operas, music, and especially electronic games.

Because of all that, I expected the publishers at Paju Book City to be on the cutting edge of digitization and beyond.

But they were not. They were desperately trying to hold on to books on paper, even resisting Kindle-like applications.

Of course, most folks in the US are as obstinately focused on reading and writing as are the Korean publishers. The incessant waves of educational reform that are characteristic of America, at least from the *Nation At Risk* hysteria of the 1980s through the absurdities of *No Child Left Behind* and whatever it morphs into, have resolutely endeavored to prepare all American children for the late 19th Century.

As Jack Goodlad said quite some time ago, "back to basics is where we have always been." "Anybody's grandmother [now, great, great grandmother] would feel completely at home in almost any classroom in the US."

The February 2010 issue of *Advocate*, a newsletter of the National Educational Association Higher Education division, features brief articles about the importance of visuals in education--as though that were somehow kinky, breaking news!

Marshall McLuhan must be twirling in his grave!

But maybe that is all about to change, finally, not because of anything that is going on in most classrooms or boards of education, but because of what is going on in the wider world of social media.

Marshall McLuhan said that every child's education was set back six years when they entered the first grade because of what they had been learning from television at home. Now, of course, children can bring their iPhones with them and keep on texting, sharing and learning in the classroom while the teacher drones on.

While most schools still focus on reading, 'ritin' and discipline, ignoring education in visual and other media literacy (most obviously ignoring the powerful grammar of electronic games), YouTube and a myriad of iPhone apps make acquiring visual literacy a snap, while written words become even less relevant to most young Americans.

But of course, there is still a very long way to go before we can fully leave the printed word behind except for fun (like learning Latin), or for quick notes, reminders, and labels.

You are all totally aware of all this, though you may draw different conclusions from it than I do. So I won't dwell any longer on digitization and new forms of electronic communication technologies and ask the question that every futurist must always ask which is, "what's next?"

But what is beyond electronic digits?

Biology and biotechnologies may be to the 21st C what physics and electronic technologies were to the 20th. Communication via genes and enzymes may replace communication via electrons.

We need to recollect that the electron was unknown little over one hundred years ago, and only relatively recently has been understood well enough to become the revolutionary communication vehicle it has.

So also, our knowledge of how cells and their components communicate with each other is still in its infancy, but advancing rapidly. It is quite reasonable to assume that knowledge in that area will continue to grow so that eventually we will learn not only how to use cells and enzymes to communicate the phonemes of our languages (as electrons do), but also, and much more importantly, we may learn how *to communicate as cells themselves communicate* which is presumably not via tiny alphabets or icons read by tiny eyes, or by the flapping of tiny tongues on tiny teeth as heard by tiny ears and interpreted by tiny brains.

So watch the developments in cell-signaling carefully for the next step in communication technologies.

Among other things, that may mean that we will learn how to communicate in more senses than just sight and sound that have served us so well for so long.

Smell, touch, pressure, temperature, though sometimes flirted with, are largely ignored. They are at the level that gesture once was before speech and--much later--writing were invented.

Even more exciting is the rapidly emerging possibility of direct brain to brain and object to brain communication.

Probably the hottest field in science now is brain science and its many surrounding minidisciplines. We may be on the brink of finally really understanding how people learn—how each individual learns—and of preparing curricula suitable for each person's preferred learning modes.

But there is more. For example, it was recently determined that the 116 genes that apparently give humans the ability to communicate through speech are controlled by a gene called *Foxp2*. If scientists can manipulate it appropriately, then we may be able to achieve the long-sought goal of "breaking through the interface" of eyes, ears, mouths, and fingers so as to communicate directly without words, pictures, or other manufactured symbols.

Early on in human evolution, at least 200,000 years ago, *homo sapiens* developed huge brains that enabled them to create culture, domesticate fire, make pottery and beads, bury the dead, and make up gods. But we could not talk until about 35,000-45,000 years ago when something happened to our larynx that allowed *homo sapiens, sapiens* eventually to develop the various aspects of language that enable us to communicate via sounds made by mouths and heard by ears.

The importance of language is not as a communication device, but as software for the brain. With language, we finally had something to think with, and with speech we had something by which more clearly to share and develop our thoughts.

Language turned the brain into the mind, and enabled humans for better or worse to emerge in an evolutionary nanosecond from puny hairless apes into the dominant creatures on Earth.

That is the more sobering and challenging part of the revolutionary potentials of brain science: even if we master *Foxp2* and all the rest, we must also develop a software, equivalent to language, for transferring meaning directly from the genes in one person to those in another. That may take quite some time.

But when that happens, the agony and ecstasy of writing and reading--that flash in the pan that emerged only 6000 years ago and served us well for a while--might really and truly be over.

And when that happens, the evolution of posthumanity—already foreshadowed by artificial intelligence and genetic engineering--will be one step closer. We old time humans will finally be freed to play and to pray.