



Abstract

*“Photo Education in the Information Era:  
The Declining Signal to Noise Ratio”*

Siegfried Manietta

Senior Lecturer, Department of Photography,

Queensland College of Art, Griffith University, Queensland, Australia.

Guest Professor of Photography, Central Academy of Fine Art, Beijing, PRC

It is difficult to imagine any aspect of human existence that will remain untouched by digital technology in the twenty-first century. The nature of work, communication and entertainment has already undergone profound and rapid change. Consequently education has entered new and uncharted territory. Given that “the age of computing has not yet begun” it seems we can only expect more of the same, more rapidly.

Generally commentators on communication and digital technologies focus on the technology per se, choosing to neglect the human dimension. This lecture, based largely on first-hand experience and observations, examines the emerging communication technology’s increasing effect on education in an art and design context. The lecture employs some theoretical constructs loosely grounded in communication theory to highlight salient points, examine the changing disciplines of teaching and learning and raise questions.

---

## *“Photo Education in the Information Era: The Declining Signal to Noise Ratio”*

At this forum I could speak about such visionary information technology projects as our “Global Photography Classroom” or our student-managed web publications or our “Flexible Learning” subjects. However as we all know, technologies tend to have two (or more) faces – there is no such thing as a free lunch. The aim of this paper is to examine the impact of information technology –on the human scale.

The concept of signal to noise ratio (S/Nr) originated from information theory, an abstract mathematical approach to solving electronic data transmission problems. The fundamental idea however, is relatively simple. When some form of data such as electrical pulses carrying speech patterns travels along an electrical conductor or “channel” such as a telephone line, various forms of interference may be accumulated on the journey. The telephone listener perceives this in the form of other conversations or echoes inadvertently coming down the same line. Sometimes we hear sharp crackling, soft humming, buzzing or hissing *noise* that interferes with the *signal* - the conversation we are trying to conduct. Now it is possible to place a numerical value on the relative strengths of the two kinds of data. Signal is information which carries meaning while noise is distracting, meaningless interference. In a noiseless channel communication is absolutely clear. Whenever noise is present the receiver is forced to separate or *decode* messages to extract meaning from the distracting background noise. The ratio between signal and noise determines the clarity of communication. The worse this S/Nr, the more effort the receiver must assign to decoding. Some of us may remember how difficult long-distance telephone conversations were thirty years ago. What this decoding means is we must dedicate more mental effort. It is also worth noting here the concept of *redundancy*. This refers to apparently unnecessary communication baggage. Taking the example of a telephone conversation on a noisy line the more repetition or conversational embellishment we add the more likely the listener is to catch our meaning. Therefore declining S/N ratios demand more redundant information such as words, symbols, pixels, pictures etc. and the more decoding effort is required - in a downward spiral!

To illustrate noise let us examine the effect of noise in two different images. Here noise has been introduced artificially, allowing us to compare varying degrees of noise. What we notice is that strong structural elements and simple content seem less effected by noise. We can extract information at relatively high signal to noise ratios. But where the communication is more subtle, the presence of even small amounts of noise seriously disrupts our ability to make meaning. In this case, to see the picture.

Modern communications systems have evolved – through applied engineering and mathematics, to virtually eliminate the presence of electronic noise. However this does not apply to the human environment. With the exponential growth in communication channels and channel capacity, we are exposed to ever increasing amounts of information. My proposition is this: When we are confronted with too much information, irrelevant information or undecipherable information the receiver, independent of the

potential value of the information, perceives this information as meaningless noise. Why should this be? Before we can decide relevance or meaning we must dedicate or re-direct real intellectual effort to either decoding (understanding) or at least attempting a partial decoding before either integrating (remembering) the information or disengaging and trashing information! This cognitive process costs us real physical and emotional energy.

Let us look briefly at the relationship between man and machine.

Machines are tools. Humans tend to see tools as extensions of their own bodies. Evidence for this is provided by look of pain on a motorist's face when a car is dented or the way we deal with our "personal" computers. Early in the 20<sup>th</sup> Century, time and motion studies were undertaken to improve the man-machine interface and thus improve industrial productivity. Humans were often regarded as organic robots mere extensions to the machines they served and production line attitudes defined the worker's role to keeping-up with a conveyor belt. It may seem surprising that in the age of thinking and communicating machines this attitude has not significantly changed. An unspoken expectation that human beings will perform in tandem with machines endures. I am reminded of the personal computer marketing language: user-friendly, faster, more memory, better performance, smaller and cheaper.

Now to the contemporary art and design education environment.

Having provided staff and students with computers, software, internet and intranet access, most tertiary teaching institutions now expect staff and students to work "smarter". This expression has eluded clear definition however it seems generally agreed that smarter work yields higher achievement - more outcome with less input and if this doesn't happen we blame the people. The logic seems ironclad and self-evident. If the institution can't produce more graduates, smarter graduates with less resources, less equipment, less staff, less time, less consumables, then the staff and students aren't clever, have not employed the machines advantageously and rightly deserve to work harder and longer hours! What is overlooked is the additional work generated by the technology at the human interface. The *noise* it generates! Answering mountains of e-mail, searching for web resources, constant distractions by false information on the web, advertising and special offers, exhibition invitations, administration and "administrivia" such as memos, notices, surveys. Teaching in the information era often means learning and re-learning software operations, debugging computers in addition to preparing new teaching materials, seminars and lectures - not because they are necessary but because our students now expect hi-tech low-content entertaining presentations. The work seems endless.

How did I realise that something was wrong?

I felt anger, tenseness, helpless, overwhelmed and frustration with lack of time and patience to read and to formulate clear thoughts. I felt the need to withdraw, to run away and hide. I feared the thought of logging-on and down loading my E-mail. I experienced what psychologists term the "fight or flight" response. This human consequence of excess information noise has acquired the official title "Information Fatigue Syndrome"

The reported effects of “Information Fatigue Syndrome” include:

- Stress
- Illness
- Lack of confidence
- Decreased efficiency
- Anxiety and self-doubt
- Inability to make decisions
- Loss of a sense of proportion
- Paralysis of analytical capacity

A 1997 survey of 1,300 managers (Benchmark Research for Reuters) reported that:

- 31% report receiving enormous amounts of information
- 49% feel unable to deal with the volume of information received
- 38% waste substantial time trying to locate the right information
- 47% claim information collection distracts from their primary work responsibilities
- 50% take work home or work longer as a consequence of too much information
- 61% report personal relationships have suffered as a result of information overload.

The Internet was cited the key factor generating information workload.

What coping mechanisms have evolved in Art & design Education?

In our educational environment we deal with people and people, like water, will seek the easiest path. Many students come from households where parents have provided computers and Internet access as a form of “info-tainment” believing that technological awareness will ensure future success. However information technology also invites us to pirate (or acquire or appropriate – depending on your perspective!) virtually anything virtual - images, graphics, music, text, advertising, anything – even complete essays. I sense a growing tendency among students to avoid reading and engaging with problem solving by “importing” ready-made information from various e-sources and indiscriminately weaving this into their own work. This equates to re-packaging noise as signal. Why should educators be surprised? Students are more deeply immersed in the ocean of information, redundancy and noise than teachers. Music television, radio, cell phones message banks. The medium is the message. The channel has become the signal! Communication technology instils a quick-fix mentality and invites quick answers, instant results, low effort, low intellectual quality and of course an appearance of achieving more with less.

We do not want to waste time sifting through mountains of noise searching for grains of signal - gems of useful information. Life is too short. Teaching staff who experience noise problems in their work environment are hesitant to admit this as it suggests some personal failing - a weakness in our techno-macho environment. The most popular unspoken solution to the new educational environment centres on a re-definition of “achievement”. “Bums on seats” funding policies, the need to entertain students and the

decreasing signal to noise ratio are forcing us to re-evaluate educational goals. Nothing guarantees success like low expectations!

Where are we going?

Only ten years ago information technology and computing experts promised less work, more quality time, less drudgery, higher quality of life. I believe we have fallen into a techno-trap. We seem to be diverting precious resources into teaching software operations. (How and where to click the computer mouse) I suggest we teach software operation largely because it's easy to teach, entertaining and expedient. I believe we are now teaching *noise*. Students walk away an impression of achievement – the wow factor - click and its done – we may have no understanding how or why, but that doesn't matter – its done - wow! I suggest we need to re-focus attention on such old-fashioned virtues as independent critical thinking, transference of knowledge, applications and problem solving. (Why to click the mouse!) I believe its time we return to the fundamentals. Information technology will always be there, noisy, evolving, progressing and distracting. What the next generation needs is the core of traditional tertiary education; critical thinking and problem solving skills.

Let us remind ourselves that:

Quantity is no substitute for Quality  
Data is not information  
Information is not Knowledge  
Knowledge is not Understanding  
Understanding is not Wisdom

A parting thought:

Over the last million years, the tools of human communication have evolved exponentially from carved bones carried between tribes to printed paper transported by trains to light pulses carried by optical fibres – but during this remarkably short evolutionary time-span the human being remained unchanged. Human biological evolution occurs on a much longer time-scale than human technological evolution. Our brain capacity is essentially the same as our early ancestors and our capacity to deal with information remains as it was, in the Stone Age when we hunted and gathered our food! Recent predictions suggest that by the middle of this century – or perhaps a little earlier, the sum total of *all* human knowledge will be available on the humble personal computer. Now lets attempt to put this into some context – this means *all the recorded knowledge* from *all of human history*, from the visual arts, the performing arts, from chemistry physics particle physics, education, genetics, astronomy, medicine, virology, immunology, geology, vulcanology, psychology, photonics, electronics, archaeology, botany, even politics – everything! This may seem absolutely fantastic – all that information at our fingertips.

But the really big question is - what can our simple stone-age human brain do with all this information? How much information can we really hunt, gather and digest?