Technology and the heart

*I can't resist commenting on Aileen Treloar's article 'Glory Be' in the last issue of **Fine Print**. Two things have happened over the last few months to sensitize me to the 'frustration and anger' of being a new user of modern technological systems. In June this year I received a grant from the Division of Further Education to design some curriculum to help ALBE students with technical writing; four days later I suffered a heart attack.*

Fluency and breakdown

For Aileen Treloar, returning to the intuitive and fluid grace of pen and paper where the means do not intrude on your consciousness was a relief from the deliberateness involved in learning new procedures and algorithms. So too, my heart had always functioned as a intuitive system that drew no attention to itself. It had always just done its job 'chugging away in the background.' I had never needed to know how it worked; what parts there were to it; what they were called; how things could go wrong with it; what a *by-pass* was; what *beta-blockers* were; what a *myocardial infarction* is; what an *angiogram* is; what *angina* is; and so on. These were all matters for old people - like my parents - not youngsters like me.

Coping with breakdown

Aileen Treloar's encounter with the world of computing parallels my encounter with the world of modern hi-tech medicine. The patient lying in the bed next to me was an elderly Ukrainian women whose husband had died suddenly of a heart attack before she could hurry across the road to ask the neighbours for assistance. Now she herself was suffering from agonizing angina. She cried a lot; vented all her 'frustration and anger' on relatives in her mother tongue - they would sit in silence for at least 20 minutes at a time absorbing her rage before gradually intruding the odd reply, rejoinder or advice. Once, after I had had a 'fairly terse exchange ' with 'the local expert' (read, 'heart specialist'), she said something I'll never forget. She said:

> At least you can argue with them - I don't even understand what they are talking about. I just want to die and get it over with.

By this she did *not* mean she didn't understand enough English; what she meant was that she didn't understand anything about the heart as a biological system nor the medical jargon that was being used.

Crash course in biological literacy

Neither had I two days earlier; but I was busy swatting up my heart 'tutorials and user-manuals'. After each interchange with anyone - nurse or doctor - from the coronary care unit, I would re-read my short, simplified 'user manual' from the Heart Foundation. Each time I would notice something new: I would notice the term "*myocardial infarct*" - so, next conversation I would use that term even though

I felt like a fraud and a phony using words that I didn't 'own', that didn't come 'naturally'. Or, I would notice there were two main coronary arteries, and so I could ask "Was my occlusion in the left or right coronary artery?' But then I would have to go back to the brochure and try to figure out whether the left artery fed blood to the left ventricle or not - I never did figure this one out enough to be sure. I think the left artery might feed the right ventricle. Although I spent quite a bit of time trying to figure this out and have asked questions about it many times, I always forget the answer afterwards - even though at the time I think I understand. This is because I can't interpret the diagrams and picture of the heart in the literature. They seem too complicated and overwhelming. I suppose what I really should do is trace one of them a bit at a time, whereas I tend to just glance at the whole diagram and hope to take in the whole thing intuitively.

OK what's all this got to do with literacy?

To explain that I will have to return the other event I mentioned: being given some time to produce a technical writing curriculum for ALBE students. So far this article has been written in the genre of a story, a recount, a narrative telling a story about myself. Aileen Treloar's article is also a narrative, a story, but at one point she asks: "Why can't someone write a simple instruction manual that answers simple questions?" And at another point she writes: "But why could the manual not say,"*Click to turn it on. Click to turn it off. Treat the mouse like a switch*".

This text:

"*Click to turn it on. Click to turn it off. Treat the mouse like a switch*"

is a form of technical writing. It is instructional writing; it gives instructions about how to do something. The other main form of technical writing explains, not how to do something, but how something works - how the heart works; how a drug works; how a computer works.

Beyond personal meaning

Most literacy teaching has had an unnecessarily narrow focus on a small set of meanings and text types, particularly the meanings and genres associated with English teaching: personal narrative; fictional narrative, and so on. The experience of trying to read computer user-manuals or pamphlets on heart attacks is important in reminding us of the many other text types that exist within a modern society. And I would argue that mastery of these other forms of reading and writing is of increasing significance for our adult students.

Until recently most of the adult population in the world learnt their skills when young according to the principles of natural learning. They learnt to talk, walk, play games, sing songs, prepare food, tell jokes, pray, count, and play instruments by: watching others, having a go, and gradually getting it right. Learning was a process of gradual approximation in which the relationship between what one did and what

happened was intuitive and straightforward. Unfortunately, this simple, natural relationship between procedure and outcome has been severed forever - by the development of modern science.

Approximation or explicitness

When I am lying on a scanner and a young nurse is revolving a massive 2 ton steel object around my body only a few inches away and bombarding me with X-rays, I do not want her to be just 'approximating' the correct distance from my chest nor just approximating the correct dosage of nuclear radiation. With modern technology there is no room for error.

Similarly, if you hit the wrong key command on a computer you get something totally different from what you intended - you don't get an approximation of what you intended. A Backspace is not an approximation of a Save. Similarly, if you press the wrong buttons on your VCR, you don't get an approximation of 'recording a program' - you get nothing.

From analogue to digital

The reason for this is that each of these hi-tech gadgets - Nuclear scanner, Computer, and VCR - is based on digital information, not the old analogue information. With analogue, there is an natural iconic relationship between things: the quicker you want to brake, the harder you push on the pedal; the hotter you want the stove, the more you turn the knob; the faster you want to run, the quicker you move your legs. With analogue systems, we can learn naturally: we can set the agenda; the pace; and learn by successive approximation. With digital systems it is not that easy.

Users and experts

Modern technology has opened up a gap between our understanding of what we want to do (" My agenda was to do some writing using a word-processor") and the procedures for doing it (" The lender's agenda was to teach me to understand and use the *machine*."). A gap opens up between those who know the 'insides' of things - the programmers, engineers, experts - and those who are users - nurses, workers, Aileen Treloar, heart attack victims like me.

Aileen: "I don't want to know all this stuff."

Lender: "You must learn this set of principles."

Users want to know how to operate something; experts want to know how it works. Good instructional writing such as Aileen Treloar's *A Mug's Guide to Macs* teaches the operating procedures (the 'how to') with a minimum of explanation about the machine (the 'how it works'). Good user-manuals can describe the 'how to' without getting bogged down in all the 'whys and wherefores'.

New workplaces and practices

But the fact remains that we do have to learn new operating procedures that are not intuitive. Australia, along with all the developed nations of the world, is currently going through a technological revolution which will have even more impact on our lives than the industrial revolution. At least the industrial revolution preserved some relationship to the earlier 'natural' ways of learning. Trades were learnt through on-the-job apprenticeships; the relationships between weights, forces, and pressures bore some relationship to the intuitive knowledge we possessed from using our bodies; domestic and social skills were learnt by observation, by pitching in, and having a go. But now less and less knowledge is handed on in this way.

On a more domestic note, for many people even cooking, child-rearing, and managing one's happiness are now learnt mainly from instruction manuals - recipe books, 'how to' books, pop psychology books or seminars. Similarly, trade skills in apprenticeships are increasingly learnt off-the-job in TAFE Colleges. And as we all know, each new model of a hi-tech gadget has new controls, new things it can do - whether it be cars, VCRs, micro-wave ovens, fridges, sewing machines, food processors, photo-copiers, push button phones, tax forms, banking systems, or computers.

Persistence

But then if learning to master modern technological systems cannot be learnt by the old natural way, why is it that children seem to learn so quickly and easily? Aileen Treloar's suggestion is that it is because 'they have a sense of what is probable or possible. They know where to look and what to look for." Although there should be some research done, my hunch is that Aileen is wrong on this. My hunch is that children are constantly learning things when they cannot immediately see the connection between what they want to do and what they have to do to do it. They are continually faced with the problem of the gap between goals and procedures. And they too face frustration, anger and boredom. But if they are lucky, they learn not to be impatient; they learn to trust; to simply follow the instructions - and the rest will follow.

Think of some things that children have to learn how to do where there is a gap between the procedures and the goal. Learning how to add up by 'carrying the '1',etc"; learning to play John Water's riffs on the guitar; learning ballet; learning to form letters; learning to walk; learning to draw a girl; learning to put a seat belt on; learning to spread butter on bread with a knife; learning to tell the time; learning to spell words; learning to do breaststroke. All of these skills involve an enormous amount of practice. Even though they are not digital, and so can be learnt by approximation, they cannot be mastered all in one go - they have to be mastered a

bit at a time. And it is only after a lot of practice that they feel natural, automatic, intuitive, and can be done without thinking.

Becoming a child again

The difference between adults learning new skills and children learning new skills is that adults are used to doing things with grace. They are used to just speaking a language without having to think about it; used to judging the temperature of cooking food without thinking about it; and so on. Adults in settled ways of life have relied on habitual and automated skills, and thus are not used to experiencing a gap between intention and outcome; between procedure and goal.

It is only when faced with 'the new', with something we have never done before, that we are thrust back into the position of being like children again: when we have to speak a new language; when we have to operate a new machine; when we have to find our way around a new institution such a hospital (Have you ever tried to follow one of those coloured lines to get you to the CFU (coronary follow-up unit) up on the 4th floor when you are colour blind?); when we have to learn to talk again after a stroke; when we have to use a computer. This is why as teachers we 'cringe and want to apologize to our past students. The gap between the fluidity and grace of automated skill and the clumsiness of unautomated skill is wide indeed - but children have learnt to live with the frustration, anger, and humiliation of inevitably being on the clumsy side.

What can we do about all this as teachers?

Apart from using the Technical literacy curriculum that will appear some time next year - if I can overcome the frustration, anger, boredom and humiliation of learning how to write user-friendly curriculum materials, there are some steps or procedures we can keep in mind.

• **Try to find meaningful chunks by working back from the goal.** For example, don't teach someone how to word-process by first of all making them learn 'how to connect up all the leads', then 'how to initialize a disk', then 'how to boot up a system', then 'how to copy an operating system and application onto their disk' before you let them do some word-processing. (Graham Simmonds identifies the 6 commands you need to learn first in his article in this same issue of *Fine Print*).

• **'Scaffold' your students by taking care of these preliminary and background functions** for them so that they can concentrate on the most meaningful task. This is how we help a child learn to ride a bike - *we* do the balancing and steering for them while *they* learn to master the pedaling.

• **Don't over-load your students' short-term memory.** Let them concentrate on just a few things at a time - 3 is plenty. For example: Moving the cursor; Deleting; Saving.

• Let them practice these chunks until they are automatic and don't require conscious attention.

• Make sure the consequences of a mistake are not too serious. The prospect of grazed knees or of wiping the entire article you have just written is not good for focusing the mind, but good for freezing the mind with fear and panic.

• Don't forget what it is like to learn a new skill. If you *have* forgotten, try writing with your other hand; or by looking through a mirror; or try using the mouse on your Mac with the other hand. Ah! now you recall what it is like to feel incompetent, clumsy - to feel like a learner.

• Remember that with the pace of social and technological change we are now all learners in most areas of our life. There are no 'wise old elders' anymore. We are all more and more facing: the new, the unfamiliar, the untried, the untrod.

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