

The relationship between designer and user in the development of the personal computer.

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## Introduction.

I intend this essay to be a brief exploration of the phenomenon of the personal computer. I will explore both cognitive and aesthetic considerations in terms of design, and social considerations in terms of function and evolution. Having worked with digital media for two decades both as a user and a designer I will draw primarily on my own experience but with reference to a few of the great (and perhaps the not so great) who have taken a part in shaping this technological revolution.

### 1. Past, present, future (A glance to the left and the right along the information superhighway)

The nascent web of interconnected personal computers can be traced back to the time when the turning cart wheel turned from horse power to steam, and then from rail to road. The railways as a system of mass transportation were a major factor in industrialisation, the car as personal space is as much a statement of status and personality as it is a method of transportation. Now the personal computer transports us around the globe on the information superhighway with a myriad of personal and social implications. Perhaps the trace should go further back, to 1439, the year in which Johannes Gutenberg invented the printing press and movable type, enabling a world of mass communication. A third strand might lead to the 16th century thinking of René Descartes. Not as tangible as an invention such as printing press or steam engine, but as significant a factor in the development of the age of modernity in which computer technology has developed.

In the past century the acceleration in technological development has been phenomenal. It is not much more than three generations since Alexander Graham Bell famously said into his newfangled telephonic device: "Mr. Watson, come here, I want to see you."<sup>1</sup> My Grandfather was born in 1883, when personal transport was still predominantly based on the horse. Less than forty years before Bell's missive to his assistant, Sir John Herschel had coined the term Photography.<sup>2</sup> I was born in 1958, four months after the launch of Sputnik. As I approach my 50th birthday I can speedily check facts and dates on my iPhone, in an encyclopaedia that anyone can contribute to, while 'Skype' tells me that my Mother is also online. I can chat to her and see her sitting at her computer via the tiny camera embedded in the frame of her screen. If I chose, 'Google Earth' will show me a photograph of her house taken from space. A video conversation on a hand held device was sci-fi when I was a child, and concepts of a world library even sounded like science fiction; Memex and Xanadu. Appropriately enough Wiki is a native Hawaiian word meaning 'fast'.

To what extent has the development of this technology been designed. To what extent is it running to a plan or a vision? How much of this development has happened organically in unplanned evolutionary sets of consequences? Gutenberg could not have foreseen the extraordinary consequences of his printing press. Computer Pioneers may have influenced the evolution of the technology that they have given rise to, but they have had as little control over the consequences of their innovations. Visions of robots that take

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<sup>1</sup> According to Wikipedia the term Photography was coined in 1839 [http://en.wikipedia.org/wiki/Sir\\_John\\_Herschel#](http://en.wikipedia.org/wiki/Sir_John_Herschel#) (accessed 20/12/ 2007)

<sup>2</sup> According to Wikipedia this happened on the 10th of March 1876 [http://en.wikipedia.org/wiki/Alexander\\_Graham\\_Bell#\\_note-49](http://en.wikipedia.org/wiki/Alexander_Graham_Bell#_note-49) (accessed 20/12/ 2007)

care of menial work are very nearly a reality. 'Beam me up Scotty' tele-porting may yet be Sci Fi, but Second Life comes very close to realising this dream. The grand thinking machines that transcend human abilities, enabling Alan Turing's dual trains of thought, or Vannevar Bush's Memex machine, these have pretty much been realised with the combination of personal computer and world wide web. And the outcome? spam email inviting me to enlarge my penis with a pill.

*What has happened to us is an amazing invention, computers and the internet and TV, a revolution. This is not the first revolution we, the human race, has dealt with. The printing revolution, which did not take place in a matter of a few decades, but took much longer, changed our minds and ways of thinking. A foolhardy lot, we accepted it all, as we always do, never asked "What is going to happen to us now, with this invention of print?" And just as we never once stopped to ask, How are we, our minds, going to change with the new internet, which has seduced a whole generation into its inanities so that even quite reasonable people will confess that once they are hooked, it is hard to cut free, and they may find a whole day has passed in blogging and blugging etc.<sup>3</sup>*

The above is a transcription from the speech that Doris Lessing gave on receiving her Nobel prize for literature, bemoaning a decline in reading in the 'developed' world, and contrasting this with lack of books, education and basic amenities in Zimbabwe.

## 2. Compulsion and Addiction (the nature of the medium)

Western society is obsessed with computer technology. If you sit in a pub you will overhear conversations about the latest social networking fad, technical frustrations or the ubiquitous Mac/PC debate as often as conversations about house prices, football, terrorism or global catastrophe.

It was in a pub that I was introduced to computer technology, with the newly invented space invader machine that coincided with my first term at college (and swallowed much of my grant). I have steered clear of computer games since, recognising how easily I become addicted. I was also an avid 'Archers' listener. If I accidentally hear this now I balk at the inanity of following the lives of fictional characters. As with listening to conversations in pubs, watching 'soaps,' 'reality TV', or reading 'men's' and 'womens' magazines, are analogous to much of the inane content on the world wide web. It is fitting that the first book that I bought and read on this MA was Clifford Stoll's rant 'Silicon Snake Oil'. I share his love/hate relationship with computers, alternating between fascination and frustration, wonder at their potential and depression at how this potential has manifested:

*In advance, then, here are my strong reservations about the wave of computer networks. They isolate us from one another and cheapen the meaning of actual experience. They work against literacy and creativity. They will undercut our schools and libraries.*

*Forgive me. I don't want to pontificate. But I do want people to think about the decisions they're making<sup>4</sup>*

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<sup>3</sup> This transcription of Doris Lessing's speech is taken from the Nobel Prize Organisations website: [http://nobelprize.org/nobel\\_prizes/literature/laureates/2007/lessing-lecture\\_en.html](http://nobelprize.org/nobel_prizes/literature/laureates/2007/lessing-lecture_en.html) (accessed 6/1/2008)

<sup>4</sup> Stoll, Clifford (1996) *Silicon Snake Oil* Pan p3

This was written ten years ago and much of Stoll's rant has been superseded by developments in technology. But human nature is no different now to how it was when Jesus threw tables about in a temple. Can we create design of such quality that we can transcend our base human traits, or must we inevitably compromise? How are design decisions actually made on systems as vast as the internet?

I still waste an inordinate amount of my time, 'stumbling' the web, filling my hard drive with software that I don't use, answering email, deleting spam and glancing over messages posted by Freecycle members or Facebook friends. With the speed at which technological change is happening pioneers such as Tim Berners-Lee and Bill Atkinson (unlike Gutenberg) are themselves witnessing the social consequences of their innovations. And they remain enthusiastic and idealistic. I trust that they can still have influence.<sup>5</sup>



### 3. Frustration (Banging my head against a virtual brick wall)

In another early encounter with computer technology I was sitting on a sitting room floor with an Apple laptop on my lap, baby sitting, and attempting to understand the basics of 'Aldus Pagemaker'. I kept failing to grasp an essential step, going over and over the same ground until I felt sick with frustration and RSI. Thankfully this extreme is rare now although I still struggle to master the language of computers, they are not my native tongue. The baby I was sitting is now sitting A'levels and she may already be addicted to the current equivalent of space invaders, as my son is. But I no longer need to teach my students about windows and file structures, the brick wall when an accidental click does something unexpected quick as a magicians slight of hand is a rare occurrence<sup>6</sup>. Having worked with computers for two decades I should be an expert. And yet I still struggle. Are the machines too complex, or is this bad design? Is it profit over quality, backward compatibility over current functionality, or is it me, am I stupid?

*Computer Technology is still young, still exploring it's potential. The notion lingers that if you have not passed the secret rites of initiation into programming skills, you should not be allowed into the society of computer users. It is like the early days of the automobile: only the brave, the adventurous, and the mechanically sophisticated need apply.*

*Computer scientists have so far worked on developing powerful programming languages that make it possible to solve technical problems for computation. Little effort has gone toward devising the languages of interaction<sup>7</sup>*

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<sup>5</sup> Both Tim Berners-Lee and Bill Atkinson are actively involved in this debate. Atkinson states: "*what Numenta is doing is more fundamentally important to society than the personal computer and the rise of the Internet.*" Quote taken from an article about Jeff Hawkins, founder of Numenta, and designer of the Palm Pilot. [http://money.cnn.com/magazines/business2/business2\\_archive/2007/02/01/8398989/index.htm](http://money.cnn.com/magazines/business2/business2_archive/2007/02/01/8398989/index.htm) (accessed 8/1/2008)

<sup>6</sup> According to Jef Raskin, in his book *The Humane Interface* (2000) ACM Press this 'modality' should be 'designed out'. Having just dried myself on a towel with two differing sides I agree. One side dries, the other is velvety, for show, but is not good at drying. A towel with modality.

<sup>7</sup> Norman, Donald (1998) *The Design of Everyday Things* pp 179/180

I persisted with Pagemaker because I was responsible for the school magazine, I had a task, but the software can still thwart me. As I write this I don't know how to turn the auto bullet point feature off so when I hit return I unexpectedly get a new bullet point rather than a new paragraph. Donald Norman (one of the visionaries to whom I alluded in my introduction) refers to this phenomenon as 'creeping featurism' and looks forward to the 'invisible computer', a time when the machinations of the machine no longer get in the way of the task:

*Consider what the computer of the future might look like. Suppose I told you it wouldn't even be visible, that you wouldn't even know you were using one? What do I mean? Well, this is already true: you use computers when you use many modern automobiles, microwave ovens, and games<sup>8</sup>*

Designers must consider human factors and foibles if their designs are to become instinctive and invisible. Inspired perhaps by J. C. R. Licklider's seminal work on 'man-computer symbiosis'<sup>9</sup> Alan Kay refers to the "human-computer symbiosis" and Jef Raskin writes about 'cognetics' alongside ergonomics.<sup>10</sup> Norman, Kay and Raskin were all involved with the development of Apple computers. Much research was done at Xerox PARC and the Apple laboratories during the creation of the fledgling PC's 'Star' and 'Lisa' that had deep idealistic foundations in the educational theories of thinkers such as Montessori, Bruner and Piaget. This period of extraordinary research and development led to much of the now ubiquitous computer interface, the object orientated design, windows, the pointer, the development of the mouse, Bill Atkinson's drop down menus and scrollbars and Alan Kay's 'drag and drop'. I wonder if, in an extension of Piaget's theory of constructivism, humans also adapt and develop in response to the designs that are developed. In his article '*The Early History of Smalltalk*' Alan Kay talks about his dynabook as an example of a new Kuhnian paradigm, as "almost a new thing".<sup>11</sup> The set of metaphors that were adopted for the Lisa; the desktop, trash, files and documents, all based on the idea of an office, facilitated the paradigm shift to the virtual based on a language that was already understood by intended users. We understand the personal computer based on previous collective experience, but nobody really knows where this new technology is taking us.

#### 4. Seduction ([iwantoneofthose.com](http://iwantoneofthose.com))

Except for a bit of word processing on a BBC, my introduction to personal computing was a Commodore Amiga<sup>12</sup> that I appropriated for my art department in the late 80's. This computer captivated students who might not otherwise have enjoyed my subject, but willingly spent



<sup>8</sup> Norman, Donald (1998) *The Design of Everyday Things* p 185

<sup>9</sup> 30/12/2007 The whole of this is online at: <http://groups.csail.mit.edu/medg/people/psz/Licklider.html>

<sup>10</sup> Raskin, Jef *The Humane Interface* p 9

<sup>11</sup> The whole of this is online at: <http://gagne.homedns.org/~tgagne/contrib/EarlyHistoryST.html> (accessed 26/12/2007)

<sup>12</sup> This Commodore Amiga had 4K of memory, booted from a floppy disk, and ran a wonderful programme called Deluxe Paint. According to Wikipedia it was called Amiga after the Spanish for a female friend, and also so as to come before Apple and Atari alphabetically.

endless hours creating animations and artworks.

Like the motor car (but unlike microwave ovens) computers have always had this power. Digital media is very seductive. I still feel wonder as I watch a photograph in the developer or see a stick figure come alive in a flip book animation. There is magic in Ted Nelson's hypertext links, the click of the mouse on a virtual button transporting me instantly from place to place (especially so if the software designer has included a little clicking sound). As with cameras there can also be beauty in the physical design of the computer.



I have a black Apple 'Performa' complete with built in tuner, which still appeals as an object. It has not yellowed with time. The physical aspect of design has become increasingly relevant with hand held devices, although for marketing rather than longevity. The Motorola PEBL (pebble), the ipod and iphone; the sleek brushed aluminium and shiny metallic black, they are all beautiful objects. I love my digital Leica camera; it makes a shutter sound similar to my father's 1940's

Leica, even though the sound no longer has a mechanical function. It lets me know that I have taken a photo and gives me a little thrill, only slightly tainted by knowing it is manufactured by Panasonic. The button on my phone even vibrates very slightly. My daughter has a phone that looks like metal, and yet the display shines through it like Tolkien's ring, creating an object worthy of Gandalf, Merlin, or Dumbledore<sup>13</sup>. Humans have always wished to embellish the tools that they create. Like many of the artefacts in the Pitt Rivers museum, they can become beautiful, desirable objects as well as tools, like a decorated spear or boys fascination with guns. We may not do the creating ourselves, but we have choice in the gadgets we buy, and many are designed to be customised. The computing may become invisible, but the design of the device as desirable object is distinct from it's function. The 'i' that Apple appropriated is a clever device. There has been a shift from the concept of 'super brain' machine, through office tool, to media player, to a hub for 'digital life' and a fashion accessory. Even beyond this in the capitalist utopia of a virtual world where products being marketed don't even actually have to exist.<sup>14</sup>

## 5. Mac v PC

I am an Apple user, seduced by Apple design. The undulating light that lets me know my Macbook Pro is asleep might be gentle breathing, the power cord finds it's socket with a magnetic attraction, the stacks in Leopard fan with a graceful curve. I still have a Mac Classic from 1990<sup>15</sup> that is indeed now considered a classic. From the introduction of the Macintosh in 1984 with the infamous advert directed by Ridley Scott, through to the current series of "Get a Mac" advertisements, the dichotomy between west coast 'hippy' and multinational 'corporate' has been perpetrated. This clever marketing is a simplistic divide, but contains grains of truth. Apple Inc. grew in California, in the home of flower power, the child of idealists and counter-culture revolutionaries. The fledgling Microsoft was nurtured by the corporate giant IBM. Artists and designers have tended to favour Macintosh computers, while Microsoft Window's is almost ubiquitous in the business world. Bill Gates

<sup>13</sup> I find the language of the computer age very interesting, with wizards and gurus, and the Apple 'genius'.

<sup>14</sup> I am thinking of the trading in Second Life, but this also applies to the sale of software to an extent.

<sup>15</sup> This Macintosh is illustrated on the title page of this essay. The other images are other computers that I have owned, an early Apple laptop, a Commodore Amiga, and a Apple Performa.

and Steve Jobs themselves are personifications of the products their respective companies market. Gates dresses in suit and tie or shirt and jersey while Jobs wears black 't' shirt and jeans. The following transcript is taken from a television interview in 2007:

*Bill: Well, I'd give a lot to have Steve's taste. [laughter] He has natural—it's not a joke at all. I think in terms of intuitive taste, both for people and products, you know, we sat in Mac product reviews where there were questions about software choices, how things would be done that I viewed as an engineering question, you know, and that's just how my mind works. And I'd see Steve make the decision based on a sense of people and product that, you know, is even hard for me to explain. The way he does things is just different and, you know, I think it's magical. And in that case, wow.*

*Steve: You know, because Woz and I started the company based on doing the whole banana, we weren't so good at partnering with people. And, you know, actually, the funny thing is, Microsoft's one of the few companies we were able to partner with that actually worked for both companies. And we weren't so good at that, where Bill and Microsoft were really good at it because they didn't make the whole thing in the early days and they learned how to partner with people really well.<sup>16</sup>*

Accountant or designer, artist or engineer, left brain or right brain; even the menus on the early Mac dropped down from the right while on Windows a list appeared from the bottom left. From a user point of view is our choice based simply on what we are used to, or is it a factor of taste, or is it more deeply connected to differences in the way we use our brains?<sup>17</sup>

The pictorial, object oriented design of Apple software is often cited as a 'con' rather than a 'pro' by users used to Windows. Our school network manager controls his computer directly via code or via drop down or pop up lists, where I favour 'drag and drop'. He would be happy to house his machines in cardboard boxes, and he has chosen a vibrant green for the desktops of user accounts to contrast with the pillar box red of the admin account so that he can instantly spot transgression.<sup>18</sup> For me this makes the school computers unpleasant to use. I dislike the condescending tone of design elements in the Windows operating system itself, such as the concept of 'my computer'. I associate the word 'my' with 'my little pony', like 'Toys 'r' Us'. I also dislike the pop up comments in cartoon speech bubbles, icons like cartoons akin to the worst clip art. Even the design of the pointer that turns into a gloved hand reminds me of Mickey Mouse, and all the connotations attached to that icon of American culture. I was amused that the Zune, Microsoft's answer to the ipod, came in brown. Taste is obviously a factor when we make choices, complicating the designers task, but other factors are also significant. Because Apple have had a relatively small market share and have 'done the whole banana' they have been able to take the risk of major leaps forward in the design of both hardware and software, such as removing the floppy disk drive from the imac or the total redesign that led to OSX. In comparison

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<sup>16</sup> This is a section of the transcript of an interview that Kara Swisher and Walt Mossberg conducted with Microsoft Chairman Bill Gates and Apple CEO Steve Jobs at the D5 conference on May 30, 2007. Taken from <http://d5.allthingsd.com/20070531/d5-gates-jobs-transcript/> (accessed 22/12/2007)

<sup>17</sup> It is significant that many artists are blessed with dyslexia. I did a quick Google search of famous dyslexics, and the list included Leonardo Da Vinci, Pablo Picasso, Alexander Graham Bell, and Gustave Flaubert, and also Marshall McLuhan Ted Nelson and William Hewlett of Hewlett and Packard.

<sup>18</sup> The root of the word Geek comes from an old English word for Fool, or European word for Silly or Mad.

Microsoft have always had to consider backward compatibility, their design innovation has been hampered by the myriad of third party companies dependent on the Windows operating system. Meanwhile The visions of pioneers such as Ted Nelson, Tim Berners-Lee and Alan Kay have been subjugated by market forces and mass consumerism. Their visionary utopias constrained by social and economic realities. All three might wish to start over in this technological revolution.

## 6. Keyboard, Mouse and GUI.

Windows users feel bereft when presented with the one button Macintosh mouse. Simplicity has been a maxim in the design of Apple computers and the one button mouse typifies this design ethic. The original mouse devised by Doug Engelbart (as used in his 1968 demonstration of the graphical user interface) had three buttons. When worked in conjunction with a five key keyboard it enabled very speedy input of text, similar to a stenographers machine. But becoming expert took a lot of time. Ted Nelson claims that: *'A user interface should be so simple that a beginner in an emergency can understand it within ten seconds.'*<sup>19</sup>

The keyboard, the mouse and the graphical user interface can be used to illustrate several considerations salient in the relationship between designer and user. Simplicity over complexity, ease of learning over expert capability, and compatibility with intuitive and subconscious responses to designs. The qwerty keyboard is the standard input device despite alternatives, despite it not being the speediest, and despite the fact that it was designed a century before the advent of the PC to facilitate the mechanical function of a mechanical typewriter. The users for whom the original PC's were designed were used to the qwerty keyboard. A PC designed only for a Dvorak keyboard or Engelbart's five key system would not be a best seller. Tim Mott was one of the original designers at Xerox PARC developing the desktop metaphor of documents, files and trash. He later headed the company responsible for 'Director' with it's metaphors of cast and stage. Using devices, ideas and language that are already ingrained eases the adoption of a new paradigm, but perhaps at the cost of capability. The best design may not be the best design if ignorance and frustration prevent it's adoption. Design outcomes can also be unexpectedly organic. The alphabetic keyboard layout used on hand held devices, constrained by size and the 100 word limit on SMS messages led to the evolution of txt as a shorthand language to speed up communication (although predictive text and other developments may make txt a short lived phenomenon). Equally the metaphor of desktop, document and file may no longer be relevant to users whose first experience of these terms is the personal computer. Although we are now thoroughly used to these metaphors, they may hinder progress. 'Agents' and other metaphors developing through the use of the web interface and internet technology are becoming more relevant to the evolution of personal computing than the design of computer and operating system.

*If software is successful, it steers the path that many users take, and selects among many possibilities to further the creator's agenda. Suppressing the other possibilities may also be part of the agenda.*<sup>20</sup>

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<sup>19</sup> Ted Nelson, Oxford Internet Institute webcast: [http://webcast.oii.ox.ac.uk/?view=Webcast&ID=20051121\\_112](http://webcast.oii.ox.ac.uk/?view=Webcast&ID=20051121_112) (accessed 26/12/2007)

<sup>20</sup> Ted Nelson, Oxford Internet Institute webcast: [http://webcast.oii.ox.ac.uk/?view=Webcast&ID=20051121\\_112](http://webcast.oii.ox.ac.uk/?view=Webcast&ID=20051121_112) (accessed 26/12/2007)

As a designer I became painfully aware of the relationship with my users in creating a data management system for my department. I delighted in it's complexity and capability, but failed to get my colleagues to surrender their paper systems and fully adopt it. The philosopher Arthur Schopenhauer stated: *"the new idea is first denounced as the work of the insane, in a few years it is considered obvious and mundane, and finally the original denouncers will claim to have invented it."*<sup>21</sup>

To use philosophical terminology perhaps personal computing can be both phenomenal and noumenal. Perhaps the pervasive attraction of the PC is deeply embedded in the subconscious, in Schopenhauer's notion of the will.

## 7. Spam and Porn and Social Networks

The main factors working to dilute the visions of J.C.R.Licklider, Vannevar Bush, Marshall McLuhan, Ted Nelson, Tim Berners-Lee, Alan Kay and others may thus be human nature itself. Their altruistic ideals perverted by lust and greed. The internet developed from military roots through academia to the current anarchic world wide web. Control over the design has not been possible, and is perhaps not desirable. Litigation to prevent young people accessing pornographic sites might also stop them accessing valuable material. Artificial constraint might stultify the unexpected organic developments that occur. Pornographic websites<sup>22</sup> and spam exist because there is a demand for them in a system based on free markets and the power of the consumer. Schopenhauer cites art as an example of mankind rising above base human nature, but much of the worlds greatest art is great because it taps deep universal energies. The very words 'designing interactions' implies a two way process. The extraordinary speed in the uptake of the use of social networking sites<sup>23</sup> must signify that they reach deeply into the collective psyche; the need to tell stories, gossip, and establish identity. The whole phenomenon of the personal computer is unprecedented, encompassing as it does communication, education, commerce, entertainment, information, possession, status, and more besides.

## Conclusion

I have skimmed over various design considerations, highlighting questions rather than offering answers. I set out to explore the phenomenon of the personal computer, and the relationship between user and designer, and I conclude that the relationship is truly complex. The computer is an object, like a car, and like the car also a method of transportation. Like the car which depends on an infrastructure of roads the personal computer is now inextricably bound to the internet. The design of the computer is also the design of the interaction with the object, and the interaction with the system. Software

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<sup>21</sup> Kay, Alan *The Early History of Smalltalk*, <http://gagne.homedns.org/~tgagne/contrib/EarlyHistoryST.html> (accessed 2/1/2008)

<sup>22</sup> In 2003 there was an estimated 8 million pornographic sites on the web. <http://www.theage.com.au/articles/2003/12/29/1072546467096.html> (accessed 30/12/2007). I received over 140 junk emails over a recent 24 hour period.

<sup>23</sup> According to a recent BBC news broadcast, 40% of adults in the UK spent an average of 5.3 hours a month on social networking sites during 2006 <http://news.cnet.co.uk/software/0,39029694,49294718,00.htm> (accessed 30/12/2007)

design encompasses the look of the interface, the metaphors that might be used, interactions within the system design, and how it interacts with other interdependent systems. The most expensive, most beautifully designed computer might be as useful as a super-car in a traffic jam. Superior designs can become victim of commercial considerations, like Brunel's undoubtedly superior broad gauge railway. The giant corporations such as Apple, Microsoft, HP and IBM have taken us down a route guided by what we will buy. But this may not be the best route for us to take. There may be other routes that would better live up to the visions of the idealists. Almost from the conception of the idea, Alan Kay foresaw the role that the laptop might play, especially in the hands of the young. He is still working to realise this potential. The development of the personal computer, perhaps unlike any other technology, has been exceptionally collaborative, not just in the creation of web based content such as Wikipedia, but also with the open source movement. In his book *Designing Interactions* (2006) Bill Moggridge quotes from an interview with Alan Kay:

*He (Alan Kay) then read Mcluhan's Understanding Media (1964), and the concept that "the medium is the message" made him believe that it is in the nature of people to be reshaped by tools, that the invention of the printing press really did make us a scientific society, and hence living in the age of the computers will reshape us again: The computer is a medium! I had always thought of the computer as a tool, perhaps a vehicle - a much weaker conception. What Mcluhan was saying is that if the personal computer is truly a new medium then the very use of it will actually change the thought patterns of an entire civilisation. He had certainly been right about the electronic stained-glass window that is television - a remedievalizing tribal influence at best.<sup>24</sup>*

Where might we be heading? Ted Nelson talks about invisible computers, connected devices, maybe fridges that automatically order goods from Tesco. I think that we will not easily give up the alluring object, the fashion statement, the status symbol, but the direction in which we are heading is towards cheap and very expendable devices that connect us to the web. The design of these can change rapidly, responding to the vagaries of fashion. The Leica camera that my father bought in the 1940's has lasted him a lifetime, I am lucky if my son manages a year with his mobile phone, blasé in the knowledge that the contract includes upgrades. The greatest design challenge at present is making constructive use of the phenomenal amount of information now available to us, with increasingly sophisticated structures such as the GGG<sup>25</sup> suggested by Tim Berners-Lee as a development of the world wide web. With hardware the development may well be akin to Alan Kay's Dynabook; the dream of a \$100 laptop, the merging of the personal computer with the mobile phone. The personal computer as a terminal to the software applications and personal storage facilities which will be back on gigantic corporate and centralised servers. Maybe computers for every child, computers designed for the third world as well as the western world. Or perhaps further technological development such as Jeff Hawkin's 'Numenta' will take personal computing on a different route.<sup>26</sup>

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<sup>24</sup> Moggridge, Bill *Designing Interactions* p 159

<sup>25</sup> This is a link to information on Wikipedia about Tim Berners' Lee's thoughts on what he terms the Giant Global Graph: [http://en.wikipedia.org/wiki/Giant\\_Global\\_Graph](http://en.wikipedia.org/wiki/Giant_Global_Graph) (accessed 4/1/2008)

<sup>26</sup> Article on Numenta: [http://money.cnn.com/magazines/business2/business2\\_archive/2007/02/01/8398989/index.htm](http://money.cnn.com/magazines/business2/business2_archive/2007/02/01/8398989/index.htm) (accessed 8/1/2008)

I have perhaps erred toward the ambitions in looking at the design of the system as a whole as well as considering elements of product design, but the two are inevitably linked. Soon the personal computer will be as much a part of the system as is the telephone to telecommunications. Indeed, with 'Skype', this is one of the uses to which I now put my computer. With the future in mind I will end this essay with two further quotes:

*Maybe we can continue another very small step along that path that we started when we stopped (some of us, most of the time) using violence to settle or to decide things, and moved on to using money, or in some cases stopped using money and started actually thinking about what other people were feeling and trying to do, and sharing their goals. Maybe we can find new systems based on peer respect, in which we work together and appreciate that we are all in fact trying to go in the same direction. To me that would be very exciting and make the whole thing worthwhile.* <sup>27</sup>

*"They (today's internet hustlers) truly believe in virtual communities and electronic classrooms. They'll tell you how the computer is a tool to be used, not abused. Because clearly, the computer is key to the future. The key ingredient of their silicon snake oil is a technocratic belief that computers and networks will make a better society. Access to information, better communications, and electronic programs can cure social problems."*<sup>28</sup>

I am not sure that I share the optimism of Tim Berners-Lee, but neither am I as cynical as Clifford Stoll.

Ross Wallis  
December 2007

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<sup>27</sup> Taken from a transcript of Tim Berners-Lee's talk to the LCS 35th Anniversary celebrations, Cambridge Massachusetts, 1999/April/14: <http://www.w3.org/1999/04/13-tbl.html> (accessed 4/1/2008)

<sup>28</sup> Stoll, (1996) *Silicon Snake Oil* p 50

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