Marshall McLuhan
and the future of work
in a world of information

Marc Bélanger

Marshall McLuhan argued that, with its electric media, humankind is creating a world of information which can be considered a global artform. People who work within this artform will act as artists designing media or helping to design media. They will need democratic workplaces, artistic training, and life-long learning. An example of a medium designed according to McLuhan's principles of media is given.

Marshall McLuhan paid close attention to the subject of work: how it was organized, who did it, how it changed over time, and, most importantly, what effects media had on it. He considered work, especially work in societies affected by electric media such as television, telephones, and computers, a subject that needed to be studied carefully because of its importance to all.

McLuhan argued that the technologies people use – which he referred to as media – create invisible environments which have powerful effects on how people think about and perform work. These effects are difficult to see because people become enamoured – numbed – by new media because the media are essentially extensions of human physical and psychic attributes. The effects can be most clearly seen by people who adopt artistic orientations to the world around them and develop counter environments. Furthermore, because we are using media to build an artificial work-world of information, work is becoming art and workers artists. He provides a set of ideas for discovering the effects electric media will have on work and a tool kit for workers to apply as they explore the global artform of information they are creating. The central question being addressed in this essay is: how did Marshall McLuhan want workers to confront the effects of new electric technologies? The conclusion is that he wanted them to develop their artistic capabilities in order to see more clearly the effects of the technologies around them and thereby protect and enhance their humanity.

The literature on McLuhan's view of work

There has been little attention paid to McLuhan's views concerning work. There are two books which address some of McLuhan's views on the subject (Logan, 2000; Federman, de Kerckhove, 2003). These books focus narrowly on particular, though important, aspects of McLuhan's views about work.

Federman and de Kerckhove discuss strategies for engaging with technologies and managing a workforce. Logan concentrates on the argument that the internet is a language and discusses the connection between learning and work while analyzing (in a McLuhan-inspired way) new technologies that have been coming into workplaces. Neither books provide a overall view of McLuhan's thoughts about work (nor do they claim to). The failure to comprehensively consider McLuhan's ideas about work is most striking in attempts to renew interest in his ideas. The double issue of the Canadian *Journal of Communication* (CJC, 1989) devoted to McLuhan makes no mention of the subject. In an article in that journal designed to stimulate a reassessment of McLuhan by reviewing his contributions Jeffrey does not mention work as one of his interests (Jeffrey, 1989). In 2000 another journal review, *Media Information Australia* (MIA, 2000), also fails to mention the topic anywhere in its eight articles. Even the works focused on providing a re-appraisal of McLuhan through critical theory ignore the subject (Stamps, 1995) or mention it only in passing (Grosswiler, 1998, pp.87-88). Willmott (1996) provides a significant account of McLuhan's thoughts on art, but does not discuss McLuhan's views concerning the linkage between art and work. Theall lists McLuhan's "fundamental contributions" which includes that "the new world must be understood through its arts, artists, and poets. . . ." (Theall, 2001, p. 213) but fails to mention the subject of work in the information world. Logan's update of *Understanding Media* relegates the subject of work to a couple of paragraphs (Logan, 2010, p. 81) whereas McLuhan discussed work throughout his book and focused on it at length in the concluding chapter on "Automation: Learning a Living" (McLuhan, 1964a, pp. 300-311). We are in danger of fostering a renewal of interest in McLuhan's thought which ignores a subject he considered vitally important.

The lack of literature concerning McLuhan's views about work in society can be partly attributed to writers on the political left refusing to consider his work seriously or even rejecting it outright (Theall, 2001, p. 211; Sykes, 2000, pp. 57-70). Writers on the left, after all, have been a major source of thinking about work and workers. The most influential critique from the left was produced by the British neo-Marxist writer, Raymond Williams, who in 1974 declared McLuhan to be a technological determinist who privileged form over content as illustrated in the phrase "the medium is the message" (Jones, 2000, p. 40). The objections the left raised about McLuhan's work have been listed by Marshall (2000) as: the total oversight of political economy, the oversimplification of globalization, the lack of theoretical development of the concept of power and the over determination of technology. These arguments are all, except one, difficult to refute. The one questionable objection Marshall presents (echoing Williams) is that McLuhan was a technological determinist. Balka took McLuhan's maxim `the medium is the message` as a starting point to examine this question and concluded:

> that although we can read McLuhan`s phrase as evidence of his deterministic understanding of technology, another reading is possible. McLuhan`s notion that the medium is the message can also be read within the context of a social constructivist understanding of technology, which sees society and technology as mutually shaping phenomena. Inherent to such a reading of McLuhan is an understanding of technology as the output of social processes, in

which humans have agency, and in which social processes, though partially reflecting technology, are not wholly determined by technological change. (Balka, 2000, p. 73)

The view that McLuhan's work was not deterministic is supported by Jeffrey who wrote that in death McLuhan "seems to have become a kind of bogeyman of technological determinism". She writes: "Heyer has noted that scholars including Stephen Kern, Walter Ong and Neil Postman (to name a few, not a technological determinist among them) have found some positive significance for the research entreprise of communications in McLuhan's work (Heyer, 1988)" (Jeffrey, 2000, p. 3).

Logan addresses Marshall's contention that McLuhan was a technological determinist in an extensive analysis (Logan, 2010, pp. 21-26). He argues that it is simplistic "to label anyone who posits a relationship between technology and societal transformation as a technological determinist". The real question is whether the writer embraces "a single cause or multiple causes in explaining societal transformation". He concludes that "McLuhan was not a single-cause explainer of anything" (Logan, 2010, p. 22). McLuhan, according to Logan, regarded the relationship between media and society as a "complex process of interaction" and quotes McLuhan as saying: "We live today in the Age of Information and Communication because electric media instantly and constantly create a total field of interacting events in which all men participate (McLuhan, 1964a, p. 219, quoted in Logan, 2010, p. 22).

McLuhan himself was quite clear about the question of determinism in his work:

> The point is … how do we become aware of the effects of alphabet or print or telegraph in shaping our behaviour? For it is absurd and ignoble to be shaped by such means. Knowledge does not extend but restricts the areas of determinism. (McLuhan, 1962, p. 247)

Addressing the question of determinism in McLuhan's work is important because, if he had been a strict technological determinist, his thought would have left little space to allow for political activists to understand and influence the world around them. Technologies would determine outcomes regardless of the efforts of people. But as Balka, Jeffrey, Logan and others, including McLuhan himself, have pointed out men and women can gain insight into the effects of technologies and then act. Consideration of these effects is the prime instrument we have as we develop our role as agents of social change in the interplay of society and technology and organizers of work. As we do so, we are not obliged to adopt wholly a McLuhan theory of technological change – especially given that he himself admitted: "I have no theories whatever about anything. I make observations. . . (Theall, 2000. p. 19)". We can take some criticisms, such as those levied by Marshall, seriously. The goal is to uncover the effects of technologies as best we can in our efforts to enhance the human condition. McLuhan can help us do that. Then it is up to us to act with what we have learned.

McLuhan's cultural and political programme

Given that the author is a labour union educator, it will not seem unusual that this review of McLuhan's ideas begins with an account of a complementary application of his work by an auto union. It may however, be somewhat surprising to read that this use of his work was in a labour education newsletter published in 1951, the year *The Mechanical Bride* was published (UAW-CIO Ammunition, 1951, pp. 29-31). While the New York Times was harshly criticizing the book (Cohn, 1951) and sales were limited to a few hundred copies (Carey, 1998, p. 296), the United Autoworkers union (UAW) was using *The Mechanical Bride* as a tool for critically analyzing advertising, corporate control of society and shop floor relations, while suggesting to union families that they talk about its lessons around the dinner table. Willmott writes that this was:

> . . . one fate of *The Mechanical Bride* McLuhan could hardly have expected: the book found itself reduced to article length, glossed with more left-inflected rhetoric, and embellished with additional cultural "exhibits" in Ammunition – the trade paper of a CIO automobile workers' union. While such a transmission hardly remains true to McLuhan . . . .
> (Wilmott, p. 91)

On the contrary. McLuhan may not have welcomed the leftist rhetoric but, given my experiences with him while attending his Monday night seminars at the McLuhan Programme in Culture and Technology in the late 1960s, I suspect he would have been delighted to read the UAW article. He would have appreciated that somebody had taken his work and applied it – especially in 1951 when it was being rejected by many. As for the suggestion that "such a transmission hardly remains true to McLuhan. . . ." again, this is not quite correct. A reading of *The Mechanical Bride* will show that the socialists in the UAW labour education department followed quite closely the political and cultural programme that McLuhan put forward in the book. Any consideration of McLuhan's thought on work, or any other subject he addressed for that matter, must be based on a clear understanding of the arguments he presented and the positions he took in *The Mechanical Bride*.

In *The Mechanical Bride* McLuhan was concerned with the state of mind of men and women who were affected by ads, newspapers and magazines, all owned by big business. These ads and news outlets he writes "do not argue with their readers. They wallop the unconscious instead" (McLuhan, 1951, p. 10). The result is that people sink into "a subrational trance" where even "a very able person may often freeze or anesthetise large areas of his mind and experience for the sake of social and practical success or the pleasures of group solidarity" (McLuhan, 1951, p. 10). The dreams in advertisements "meet a somnambulist public that accepts them uncritically. Otherwise, how explain the absence of reaction in the name of human dignity which they destroy?" (McLuhan, 1951, p. 13). The result is:

> The ordinary person senses the greatness of the odds against him even without thought or analysis, and he adapts his attitudes unconsciously. A huge passivity has settled on industrial

society. For people carried about in mechanical vehicles, earning their living by waiting on machines, listening much of the day to canned music, watching packaged movie entertainment and capsulated news, for such people it would require an exceptional degree of awareness and an especial heroism of effort to be anything but supine consumers of processed goods. (McLuhan, 1951, p. 21)

The problem of humankind living with its technologies is not only a cultural one according to McLuhan. It also has a political dimension. Referring to the owner of Time and other news outlets, Henry Luce, (the Rupert Murdoch of his day), McLuhan writes in *The Mechanical Bride*, decades before Fox News:

It is plain that the Ballet Luce embraces, in a carefully calculated way, the arts of communication and control as at present these have been ordered to tease, soothe, and flatter a mass public. Perhaps we should be thankful that Mr. Luce and his advisors are content to enjoy the irresponsible manipulation of these arts and techniques as entertainment without directing them to achievement of the direct political power. (McLuhan, 1951, p. 11)

McLuhan sees a way out of the "huge passivity" humans have fallen into because:

… as passivity becomes extreme in the bulk of society, a sizable segment of citizens detaches itself from the dream-locked majority. As vulgarity and stupidity thicken, more and more people awaken to the intolerability of their condition. Much can be done to foster this state of awareness, even though little can be done directly to change the policies of those in control today of the media of communication. (McLuhan, 1951, p. 22)

How this critical mass of citizens comes about is not clear. What is clear is that McLuhan argues for the fostering of a state of awareness which is able to confront the agents of cultural and political somnambulism. He offers "the "symbolist esthetic theory of the late nineteenth century…for resolving the human problems created by technology" (McLuhan, 1951, p. 34). This theory "leads to a conception of orchestrating human arts, interests, and pursuits . . . (which is) neither progressive nor reactionary but embraces all previous actualizations of human excellence while welcoming the new in a simultaneous present" (McLuhan, 1951, p. 34).

McLuhan never disavows the political and cultural programme he put forward in *The Mechanical Bride*. On the contrary, he continues to refer people to his first book. In 1974, in response to a critic of his views, Everett Dennis, he writes: "Why did Dennis choose to ignore the Mechanical Bride?" (Molinaro, et al. 1987, p. 506). That is a very good question for anybody attempting to understand McLuhan's views on any of the subjects he addressed, especially work in society.

New technologies will change work significantly

If McLuhan's ideas about work and media are correct they are warnings that we are headed into disturbing, yet potentially life-enhancing times. McLuhan argued that the introduction of new media into societies changed the nature and pace of work: "Every new technology, be it a microphone or telephone or wheel, creates a new kind of work environment" (McLuhan, 1966). The consequences of these new technologies, according to McLuhan, can be monumental. The introduction of the alphabet between 1,800 and 1,000 B.C.E he suggests, moved humankind out of an almost exclusively oral world and began "a continuous drive in the Western world toward the separation of the senses, of functions, of operations, of states emotional and political, as well as tasks . . ." (McLuhan, 1962, pp. 42-43). This segmentation of tasks divided the previously whole activity of a person's work life into separate acts. Doing so provided impetus for greater productivity in society but also heightened the potential for increased alienation of people from their labour. It began, according to McLuhan "three thousand years of specialist explosion and of increasing alienation . . ." (McLuhan, 1964a, p. 20). Print, introduced by Gutenberg and others around 1450, vastly increased the power of segmentation in society as consideration of its individual units of type prompted people to think of manipulating the world around them in segmental steps. McLuhan contends that : "The mechanization of the ancient handicraft of the scribe was 'applied knowledge'. . . .That is why, once this solution was worked out, it could be extended to the mechanizing of many other actions" (McLuhan, 1962, p.151). Thinking about the power of segmentation may have influenced people to consider applying it as scientific method and in mechanical innovation thereby helping to initiate the Scientific and Industrial Revolutions which had profound effects on how Western society organized work. However, the effects of electrically-based technologies, according to McLuhan, will be even more consequential. He argues that technologies such as the telegraph, telephone, television and computers are moving us away from a bias for segmental thought to mental dynamics more related to oral activity than mechanical production. He writes: "All values apart, we must learn today that our electric technology has consequences for our most ordinary perceptions and habits of action which are quickly recreating in us the mental processes of the most primitive men" (McLuhan, 1962, p. 30). This portends severe consequences for the world of work.

Consider just a few of the new technologies, or major variants of existing technologies, which are coming into action at the start of the 21st century: nanotechnology; additive manufacturing (the creation of individual products by building up minute layers of sprayed material); inexpensive computer-telephones (which will transform especially societies in the developing world); instant individual video-making to replace voice messaging; high-definition telepresence for video-conferencing; billions of virtual computers easily and immediately accessible from huge server farms . . . the list goes on. We need to think about the effects that these technologies, plus as yet undiscovered ones, will have on the world of work. To help us do that we should study the teachings of the man who brought to the world an understanding that our tools create environments that effect all we do, including the central human activity of work. One of those teachings is that, as work becomes the manipulation of human-produced information, workers within that sphere of information-work become artists.

Workers as artists

The idea that many of us are becoming artists, and McLuhan's view of this situation, has been noted, but not extended to an analysis of work. Doeden writes (1981, p. 49) : ". . . the intermedia environment is making artists of us all. For the media, like art, extend perception and transform experience. . . . An understanding of the counter environmental nature of art…is indeed critical to understanding the radical evolution now taking place in Western cultures." At the conclusion of his essay Doeden notes: "The circumambient universe is art: the intermedia network is making artists of us all" (Doeden, 1981 p. 55). However, he does not discuss how this will effect the world of work.

To understand McLuhan`s views about how media are transforming workers into artists we need to touch upon a number of topics: the major media and their effects, how work has been altered by various media over time, and the role of artists in the "art-ificial' world of work.

Understanding media

Any understanding of what McLuhan thought about work in the electric world must be based on his concept of "media". In his famous Playboy interview he said: " …my definition of the media is broad; it includes any technology whatever that creates extensions of the human body and sense from clothing to the computer" (Playboy, 1969). These media, because they are created by humans thinking, talking and implementing, are concrete instances of myths made into technologies. He maintains that: "Any codification of human energy or awareness is myth. The gap in all modern studies of mythology is failure to recognize technologies as myths" (McLuhan, Nevitt, 1973, p. 29). A myth is: "the instant vision of a complex process that ordinarily extends over a long period (McLuhan, 1964a, p. 38)".

Not only are technologies myths that have been made into hardware and software, but according to McLuhan, they are also metaphors. "All media are active metaphors in their power to translate experience into new forms" (McLuhan, 1964a, p. 64). McLuhan tells an interviewer:

All human artifacts are metaphors or bridges between situations. It doesn't matter if it's a word or hardware. It's an attempt to relate two situations that are not easily, or ordinarily related…All words do this. Every word is an attempt at bridging some situation. . . . Then we realize that all the media are words. That every single human artifact, hardware or software is a word – is linguistic in the full sense, and that all of man's outerings or extensions or his body are really metaphors or linguistic forms and are in fact language. (Sohn, 1978)

This is where the artistic project of the worker begins. If technologies can be seen as myths made concrete, and also linguistic metaphors linking two situations, we are provided with an entry point into understanding them, seeing their effects and influencing them. That entry point is the application of literary and linguistic thinking tools to uncover and understand technologies. For McLuhan, poetic

technique, especially the poetic technique of the 19th century symbolists Charles Baudelaire, Edgar Allan Poe, Stéphane Mallarmé and Paul Verlaine, is a tool that can be used, as he put it in *The Mechanical Bride*, for "resolving the human problems created by technology" (McLuhan, 1951, p. 34). Willmott describes the effect of the symbolist poem:

> 'Rhetoric must go, said the Symbolists. Ideas as ideas must go. They may return as part of a landscape that is ordered by other means' What is the technology of these other means? Its pivotal point is the 'rendering of an instant or awareness which (frees) the mind from the clogs of habitual perception'. (Willmott, 1996, p. 60)

This is what might be considered McLuhan's overarching purpose: the stimulation of pivotal points which render an instant of awareness which frees the mind to perceive more clearly. Poetry and poetic vision can be used to do this. When you read a poem according to McLuhan:

> You 'put on' the poet's *medium* and become its *content* by adjusting yourself to use his poem in altering your perception of the world. Whereas this alteration is the *meaning* of the poem for you, its *message* is the totality of its effects, present and future, in the worlds of 'software' and 'hardware' alike. (McLuhan, Nevitt, 1972, p. 141)

It is this emphasis on understanding effects which pervades McLuhan's work. He writes: "What is new in any innovation is not the product but its effects" (McLuhan, Nevitt, 1972, p. 60). These effects can be difficult, if not impossible, to see as a new technology is introduced because " …it is experience, rather than understanding, that influences behaviour, especially in collective matters of media and technology, where the individual is almost inevitably unaware of their effect upon him" (McLuhan, 1964a, p. 277). Artistic imagination can be used to strip away some of the "clogs of habitual perception" as the Symbolists put it, and see clearly the effects of the technologies or at least build awareness of them. This is because artists work to create effects and are more attuned to seeing the effects of technologies around them. As McLuhan wrote, the artist asks: "What precise *effect* do I want to have on my public? What precise emotion do I wish to evoke and define? The artist starts with the *effect* since the *means* to such an effect are everywhere" (McLuhan, Nevitt, 1972, p. 99).

Technologies as human extensions

The technologies which provoke the effects artists can become attuned to are, according to McLuhan, extensions of ourselves. "An extension appears to be an amplification of an organ, a sense, or a function, that inspires the central nervous system to a self-protective gesture of numbing of the extending areas, at least so far as direct inspection and awareness are concerned" (McLuhan, 1964a, p. 157). These extensions which we use to order and manipulate the stuff around us exist as they do because we have applied *human thinking* to how we design and use technologies. We are biased in how we conceive, react to, and create technologies because we are humans who, quite naturally, think as

humans do. We use mythic thinking to confront the vast array of information available to us and when we create technologies. Myths can help us understand what is happening. For example, the point of the Narcissus myth, says McLuhan, "is the fact that men at once become fascinated by any extensions of themselves in any material other than themselves" (McLuhan, 1964a, p. 51). This fascination not only numbs us, McLuhan points out, but makes us servants, even slaves of the technologies we have created.

> It is this continuous embrace of our own technology in daily use that puts us in the Narcissus role of the subliminal awareness and numbness in relation to these images of ourselves. By constantly embracing technologies, we relate ourselves to them as servomechanisms. That is why we must, to use them at all, serve these objects, these extensions of ourselves, as gods or minor religions. (McLuhan, 1964a, p. 55)

McLuhan argues that artistic vision can help us break through the numbing and see the effects that have been induced by media.

Media have certain dynamics and consequences which need to be considered as we search for ways out of the numbing and into a discovery of the effects. First of all, they change perceptions. The student of media, wrote McLuhan "…will also study media as bringing about new perceptual habits" (McLuhan, 1964a, p. viii). They simultaneously create both services *and* disservices. Every service "always has some effects that are extremely inconvenient" McLuhan told an interviewer (van Santen, 1972). They change sense ratios by raising one or more to the fore. Alphabet and print technology biased the sense ratio towards the visual as in Euclidean space: linear, flat, straight, uniform, full of connections.

Acoustic space

As electric media come into play the sense ratio becomes biased to *acoustic space*, which is described by McLuhan in this way:

> Acoustic space is constituted by the fact that we hear from all directions at once. Acoustic space is a structure whose centre is everywhere and whose margin is nowhere. Visual space permits the idea of closure and acoustic space does not. Visual space has content. Acoustic space has none. Visual space may have something in it. Acoustics space simply is. (McLuhan, 1971)

The world of acoustic space is an arena of rapid interaction where everything is related to everything, all is margin and centre simultaneously, boundaries are non-existent and the whole is always present. It has the attributes of the world of activity the novelist William Gibson artistically described as "cyberspace" (Gibson, 1984, p. 4). Acoustic space is an important topic because it is within the realm of acoustic space that we will work as automation is increasingly applied. McLuhan wrote that automation:

…has much more in common with the acoustic world and very little in common with the visual world. Speaking, that is in configurational terms, automation tends to restore the integral and inclusive patterns of work and learning that characterized the age of the hunter and the food-gatherer. . . . Paradoxically, the electric age of cybernation is unifying and integrating whereas the mechanical age has been fragmenting and dissociating. (McLuhan, 1964b, p. 17)

A more complete understanding of McLuhan and acoustic space can be had by a reading of Cavell's *McLuhan in Space: A Cultural Geography*. Cavell writes: "McLuhan would have precisely argued that the underestimation of *acoustic* space arises from the overestimation of *visual* space. . . (Clavell, 2002, p. 29). This overestimation is promoted by the fact that we have been affected by 400 years of print technology. We are now headed into a time in which, because of our use of electric media, we will live and work in patterns more related to acoustic than visual space.

Media create work environments

Media, the extensions of humankind, create *environments* in which people and technologies interact. Every new technology or product creates environments which are not, McLuhan contends, just "passive containers of people, but active processes that reshape people and other technologies alike" (McLuhan, 1962, preface).

McLuhan argues that, broadly, there have been four ages in which particular extensions and their effects have dominated: the oral, phonetic, print and electrical. The oral age was the age of hunter-gathers, a time when people hunted and foraged as a way of surviving. This age ends when humankind adopts sedentary ways, settles in villages and cities and, most significantly, adopts the phonetic alphabet. In this era specialism begins as the universal trade of hunting and support for it breaks down into various trades. This division of labour begins to promote individualism as workers begin to identify with various crafts and create roles for themselves in society. Scribes appear. Reading – especially reading without vocalizing - encourages introspection. Then, around 1450, the third age comes into effect: print is introduced.

Starting with the mechanization of the scribal art, print begins to change how tasks are seen. They are analyzed as a series of segmental steps and then the steps are built into a mechanization process as a series of uniform, repeatable and moveable parts. This method of applying knowledge can then be extended to the mechanization of many other tasks. McLuhan suggests that: " … the mere acustomation to the repetitive, lineal patterns of the printed page strongly dispose people to transfer such approaches to all kinds of other problems" (McLuhan, 1962, p. 151). The introduction of print promotes, over time, many psychic, social and economic rearrangements. It further deemphasizes reliance on orality – a process which began when sedentary humankind started to adopt the phonetic alphabet and

numbers. It promotes greater visualization which includes the demand to see connections between things when thinking about them. The division of labour is intensified until workers become rather like units of hardware applied to the production of artifacts. Homogeneity across the population is encouraged because factories need a regular supply of identically educated people. At the same time, the sense of individualism is even further enhanced, leading to a decline in the sense of community. Meanwhile, the division between producer and consumer is exacerbated. Book readers, such as scribes and students, who had been part of book production, now buy books as mass-produced consumer products. And labour, McLuhan points out, becomes disconnected from its deep roots in community by the creation of financial markets.

> Under pre-industrial conditions 'labor power' had, as it were, remained embodied in the whole man. This man was not an independent worker, but dependent on the man-master relationship. The market broke this personal bondage and freed 'labor power' to sink or swim on the competitive market waves, along with its possessor. (McLuhan, Nevitt, 1972, p. 65)

As the Industrial Revolution proceeded, workers were treated as commodities just like the machine parts they worked with and the products that they helped the machines produce. It is no coincidence that at the end of World War I labour representatives were demanding that the peace treaty include clauses promising that the "labour of a human being should not be treated as merchandise or an article of commerce" (ILO). Later, after a second world war, they would succeed in having the constitution of the International Labour Organization state, right at the start, that "labour is not a commodity" (O'Higgins, 1997, p. 225).

Roles vs. jobs

Print started the process by which the world of *roles* as employment started fragmenting into specialized *jobs*. A role was a way of *being* where, as McLuhan put it: "each person in himself was involved in a variety of tasks and relationships" (McLuhan, 1964c). A role was total involvement. A job in his definition was "a kind of organization of work as a highly specialized and repetitive activity" (Wallace, 1967). A role, like being a mother, includes many jobs. A job is work torn out of the wholeness of life, fragmented, made specialist, resulting in alienation. It is specialism promoted by the adoption of print which differentiates the *labour* of a completely involved person such as a farmer from the *work* of a factory employee. He writes that in the: "… fragmented and mechanized world of specialisms we tended to use only a part of our faculties at any one time. This was called 'work' (McLuhan, 1967)" He also points out that: "As the Gutenberg speed-up scrapped scribes and scholasticism, it transformed the scribal role into the type-setting job. As steam scrapped craftsmen and community it created the jobs of the mechanics and the assembly line workers" (McLuhan, Nevitt, 1972, p. 64). Testimony to the importance McLuhan attaches to this translation of roles into jobs is the fact

that he uses the topic to open both the *Gutenberg Galaxy* (McLuhan, 1962, p.14) and *Understanding Media (*McLuhan, 1964a, p. 23).

After some 400 years of print bias, applied electricity came along with a rush: the telegraph (1831), the telephone (1876), electric lamps (1878), movies (1891), radio networks (1927), the IBM electric typewriter (1935), television networks (1939), commercially-available mainframe computers (1951), the fax machine (1966), ARPANET – the precursor to the Internet - (1969), the Apple II personal computer (1976), the cellular phone (1979), the World Wide Web (1994). Each of these, and many more electrically-based technologies such as teletype machines and photocopiers, created environments which changed the nature and pace of work.

The print era, according to McLuhan, fostered segmentation, fragmentation, specialism, homogeneity, visualization, applied knowledge, a division between producer and consumer plus a move away from roles to jobs with people being used as commodities. Electric technology begins the reversal of many of these effects. While humankind had previously extended many of its physical attributes – hammers for arms, pens for hands, wheels for feet – electric media begins to extend interior facilities, most apparently in the creation of the digital computer which is still often referred to with the "brain" metaphor. McLuhan argues that, not only is the human brain being extended, but so is the central nervous system: the network of cells that transmits nerve impulses between parts of the body. In describing this he writes, in 1964:

> It is the principle aspect of the electric age that it establishes a global network that has much of the character of our central nervous system. Our central nervous system is not merely an electric network, but it constitutes a single unified field of experience. As biologists point out, the brain is the interacting place where all kinds of impressions and experiences can be exchanged and translated, enabling us to *react to the world as a whole*. Naturally when electric technology comes into play, the upmost variety and extent of operations in industry and society quickly assume a unified posture. (McLuhan, 1964a, p. 302)

Extending the central nervous system

The extension of the central nervous system fosters an organically whole approach to work and production such as the just-in-time delivery systems used by General Motors and Walmart. It promotes a return to the oral patterns of thinking which dominated before the introduction of the alphabet and print. It produces a world where people interact over communication networks that create the effect of bodiless, discarnate humans, where the sender is sent virtually to the other end. Centralized corporations are broken up because paper filing demands centres to hold filing cabinets, but digital information can be stored anywhere; now every node in the organization is simultaneously a margin and a centre of information. The pace of work is speeded up so dramatically that goals are met almost as they are thought of, and so, practices such as management by objective, become obsolete. Most importantly, the

extension of the nervous system dramatically increases the effect of thinking within an environment of acoustic space.

Workers today exist as print-oriented beings facing trajectories of effects stimulated by electric technologies. By looking for these trajectories, and the products and activities, services and disservices, that technologies produce, workers can learn to better navigate through the world of work coming into play. The trajectories include: visual space thinking being over-ridden by acoustic space thinking; the elimination of margin-centre organization; decentralization; increased speed of activity; reversal of the consumer-producer division so that the consumer becomes the producer; the user as content; greater participation – or the demand for greater participation; discarnate people being sent and becoming involved in situations anywhere in the world that telephones and computers can be used; the replacement of goal-oriented practices with continual process; the translation of hardware into software so that the software which produced the product becomes paramount because it can be easily revised to produce other products; and the creation and storage of infinite amounts of information.

McLuhan thought that he had worked out some of the major effects of electric media on work in an information world. We can consider these effects in this essay as we think about how work is changing: what it will consist of, who will do it, where it will be conducted, how it will be organized, how it will be compensated, and what its future might be.

A human-made global artform

According to McLuhan much of humankind's work will consist of the artistic manipulation of information within a human-made global artform. He once told an interviewer that: "We now have to accept the fact and responsibility that the entire human environment is an artifact, an art form, that can be staged and manipulated like show biz" (Wallace, 1967). When asked by another interviewer: "Is everything shaped by human intervention a work of art?" McLuhan responded: "Oh yes, the making process as applied to institutions turns them into art-forms" (van Santen, 1972). This human-made artform is built with information, information which is limitless. Work no longer needs to be constrained by the number of fish in the sea or the amount of ore in the mine. It also defies boundaries. The reason workers in India can serve as programmers, legal assistants, call centre operators and data entry personnel for companies based in America is because they, and the companies they work for, are dealing with a wealth of information - huge, potentially unlimited amounts of it – available from anywhere on the planet.

McLuhan points out that: "As automation takes hold, it becomes obvious that information is the crucial commodity, and that solid products are merely incidental to information movement" (McLuhan, 1964a, p. 185). In fact, solid objects can be considered as information made concrete. These days they are likely products of a process that started with software. Certainly as additive manufacturing – which has software at its core - becomes more prevalent, products will be seen simply as the customized end-

13

products of a computer program. McLuhan writes: "In the new electric Age of Information and programmed production, commodities themselves assume more the character of information" (McLuhan, 1964a, p. 48).

This huge limitless pool of information is a human creation and therefore the result of creative acts – which brings us into the realm of the artist. Our goal will be to replace nature as the source of most of the work in the world. As McLuhan wrote:

> …we have now to replace nature itself, remaking it as an art form perfectly accommodated to the totality of human needs and aspirations. Such an entreprise requires nothing less than inclusive awareness of human awareness and limitations. Man-made nature, fashioned according to life as art, may tax human creativity far beyond anything levied on pre-satellite man. (McLuhan, Nevitt, 1972, pp. 294- 295)

Artistic l'earners

The people who will do the work inside the global artform will be artists and learners. They will be learners because the world of information will be in constant need of renewal which can only be provided by workers committed to life-long learning (Bélanger, 2004, pp. 493-496). They will be artists because they will be working within a global, human-created artform. As McLuhan says: "Already it is becoming clear that the main 'work' of the future will be education, that people will not so much earn a living as learn a living" (Look, 1967, p. 24). The workers of the electric world can be thought of as *artistic l'earners* because they will be earning a living by learning artistically.

In *Understanding Media* McLuhan wrote: "The artist is the man in any field, scientific or humanistic, who grasps the implications of his actions and of new knowledge in his own time. He is the man of integral awareness" (McLuhan, 1964a, p. 71). Despite the sexist language (not unusual at the time) he of course includes women in his view of worker-artists. In fact, he argues that "women today find themselves in an increasingly advantageous position". He points out that: "Business and politics today demand such deep involvement that men just get swallowed alive. Women are much better able to adapt" (Miss Chatelaine, 1974, p. 138). In any case, it is the artist – man or woman – who will work most effectively in the global artform. This is because, he says, "The artist smashes open the doors of perception" (McLuhan, 1970, p. 44).

The artform created by humankind will demand constant learning on the part of workers because it will change so quickly. This will have serious consequences for the skill-sets workers will need over the course of their careers. In the United States workers can expect to have about sixteen jobs over the course of their work-life (Bureau of Labor Statistics, 2010). Learning one set of skills in high school or university will not suffice. McLuhan points out that:

Mechanical speed-ups, however radical, in their re-shaping of personal and social life, still were allowed to happen sequentially. Men could, for the most part, get through a normal life span on the basis on a single set of skills. That is not at all the case with electric speed-up. (McLuhan, 1964a, p.308)

The effect of the creation of the global artform and the rise of artistic l'earners will be a move away from the specialized, fragmented-out-of life job back to something more akin to the roles workers used to have. Instead of the one-task job there will be the multiple-job role. McLuhan argues that:

Cybernation seems to be taking us out of the visual world of classified data back into the tribal world of integral patterns and corporate awareness. In the same way the electronic age seems to be abolishing the fragmented and specialist form of work called "jobs" and restoring us to the non-specialized dedication called "roles". We seem to be moving from the age of specialism to the age of comprehensive involvement". (McLuhan, 1964b)

The return to roles, contends McLuhan, will occur primarily because workers will be expected to use all their faculties and be totally involved just as the hunter-gather had to use all his faculties to stay alive.

An artist has a role rather than a job because he must use all his faculties at once. In the older fragmented and mechanized world of specialisms we tended to use only a part of our faculties at any one time. This was called 'work'. When, like the artist, we use all our faculties at once, we are recognized to be playing and are at leisure. A man must work very hard at his hobby, but just because he uses all his faculties while playing, he is thought to be at leisure. The electronic information environment tends to create this new configuration of leisure via total involvement. (McLuhan, 1967)

Artistically working everywhere

The new artistic work will be conducted anywhere on the planet because the material to be manipulated is information and information can be accessed from anywhere: from a solid state storage device, a local wireless network, a satellite, or a host of other sources. McLuhan predicted that this would result in an increase in work at home. "The increase in 'software' and information as industries become knowledge-oriented can have only one terminal, namely, the restoration of the decentralized 'cottage economy'" (McLuhan, Nevitt, 1972, pp. 81-82).

As an example of the new work capable of being done from home Levinson reports on how he and his wife Tina Vozick created the first online graduate student programme for the New School out of his home and concludes:

…as the Industrial Revolution went into high gear, drawing farmers into factories, and others into office buildings to work as secretaries and chief executives and a myriad of jobs in between, but equally away from home, the telephone – quietly as an initiator of calls, more than loudly, as the receiver of calls – christened the literal home office as a mass phenomenon. (Levinson, 1999, p.135)

It is not a coincidence that it was a student of McLuhan and a science fiction writer, Paul Levinson, who created in the 1980s the first online graduate degree programme. Despite its technical nature the project needed an artistic orientation to advance it.

The re-shaping of organizations which electric media will promote will be both physical and political. First, there will be constant pressure to decentralize. If work can be done anywhere there is no need to pay for large buildings in city centres which have the expensive transportation structures needed to bring workers to the office. If access to information from anywhere helps do away with the centre-margin model of corporate organization, workplaces could be put anywhere. But, as with every service there will be accompanying disservices. If workplaces can be situated anywhere, corporations can re-locate their offices almost anywhere in the world in reaction to demands by governments or unions for decent wages, social benefits or effective health and safety laws.

Job and role compensation

McLuhan was at his most economically radical when he considered the compensation associated with jobs. He started from the premise that a job fragmented people out of their wholeness as human beings. This loss of humanity cannot be completely compensated for. McLuhan points out that with the Industrial Revolution came:

the discovery that by specialist fragmentation and dehumanization, aggregations of men could perform superhuman feats of industrial production. After centuries of confronting the hidden and twisted motives of social men, it came as a mighty deliverance through mechanization to slough off humanity altogether. (McLuhan, Nevitt, 1972, p. 276)

McLuhan calls this dehumanized work "torture". In Take Today he writes: "The more specialized and savage the forms of work, the more ruthless the torture." (McLuhan, Nevitt, 1972, p. 165). This torture cannot be compensated for by higher pay. "All the 'wage' hikes and 'compensation' demanded and desired cannot confer the relevant controls and satisfaction" (McLuhan, Nevitt, 1972, p.238).

The antidote to a fragmented, specialized job is to promote roles for people so they can participate in a totally involved manner with the work they do. A mother, for example, does not have a job, she has a role which includes many different jobs. She should be paid for the value she provides

society McLuhan argues. In a world that respected roles " a pregnant mother would be highly paid for her creative role in producing a new member of the community while nourishing and instructing her social dependents and associates" (McLuhan, Nevitt, 1972, p. 229).

Not only women would be paid for their contribution to a society which respected roles, so would children because, by learning a language, they are working and contributing.

> If payment were to be proportional to the degree of 'labour productivity', children learning their mother tongue would automatically be the most highly paid members of their society. Both their motivation and their involvement are total, and their achievement correspondingly exceeds the performance of any other social group. It has long been recognized that the acquisition of one's mother tongue evokes faculties with the action of genius. (McLuhan, Nevitt, 1972, pp.228-229)

Paying children to learn their mother tongue is being applied very successfully in Brazil. The *Bolsa Família* is paid to families who keep their children in school to learn language and other subjects. The children get treats or things like new sneakers. The Economist, reports:

> Bolsa Família goes to 13 million families, around one in four. It has had a fairly dramatic effect on poverty and inequality. Marcelo Neri, a Brazilian economist, attributes 17% of the narrowing in inequality since 2001 to the programme. (Economist, 2011, p. 38)

McLuhan extends his argument for paying children and mothers to elders in society. "In the same way (as with mothers and children), the elders of the community – the social liaison with past experience – provide the means of continuity and adaptation, a role that the very young are ill-suited to perform" (McLuhan, Nevitt, 1972, p. 229).

Often it is simply a lack of creative thinking about a social or economic problem that causes great difficulties. For example, when it comes to ensuring that all members of a society are provided with the basic means to live, governments can hire people to pass out cheques using demeaning means tests or they can provide everybody a guaranteed annual salary. McLuhan writes: "Speculation is rife on just how soon the annual cost of supporting welfare bureaucracies, whether private or public, will exceed the cost of a guaranteed annual salary to provide subsistence to all" (McLuhan, Nevitt, 1972, pp. 227-228).

Here is Marshall McLuhan presenting the case for a guaranteed annual salary and for wages to be paid to mothers, children and elders. The socialists of the UAW labour education centre would have approved.

The future of work

The future of work in the electronic world according to McLuhan is discovery and learning. L'earners acting within the "art-ficial" artform created by humankind will spend their time studying information and devising new artistic ways of shaping it, sometimes by designing new media and often by helping to design them.

Work within the global artform, according to McLuhan, will tend towards exploration, discovery, the blending of art and work, and, most importantly, play. He points out that: "Electronically we are moving into an age of play which will bring many new patterns of work and learning" (McLuhan, 1972). If it were possible to transport a 19th century industrialist to a modern workplace such as Google they would see only play. The information technology workplace reporter for ZDNET, Deb Perelman, reports:

> Have you heard about working at Google? They've got tricycle conference rooms! They've got free, organic, locally sourced food from gourmet chefs. They've got dry cleaning, free transportation, backup childcare and more brightly colored plastic things than all of the kindergartens in Silicon Valley together. (Perelman, 2008)

The workplace of the information society is a playground of learning and discovery. This is because creativity cannot be ordered to exist. It must be nourished and fostered within a democratic environment. With electric technologies, such as telephones and computers, authority in the workplace becomes more attuned to the knowledge that workers have, rather than the industrial-style staff-line model of delegated authority. As McLuhan points out:

> Electric power circuits . . . eliminate both the assembly line and the delegated authority. Especially with the computer the work effort is applied at the "programming" level, and such effort is one of information and knowledge. In the decision-making and "make-happen" aspects of the work operation, the telephone and other such speed-ups of information have ended the divisions of delegated authority in favour of the "authority of knowledge". (McLuhan, 1964a, p. 232)

Recognition of the "authority of knowledge" means accepting that knowledge resides not only in executive and management ranks but throughout the organization - wherever workers have knowledge which can be applied to the organization's goals. This scenario is much closer to the model of a democratic workplace than it is to the industrial-military design of delegated authority.

The pay-off for treating workers as learners and real partners in organizations is potentially enormous. McLuhan points to the Hawthorne experiment where workers (six women) increased their productivity no matter how the researchers changed the working conditions – from good to bad, pleasant to unpleasant (Gillespie, 1993). The workers had been taken off the assembly line, provided a separate workspace, and given a co-operative administrator. The researchers sat with the workers as they

performed their tasks. McLuhan writes that what the researchers missed was "the all-important fact that when workers are permitted to join their energies to a process of learning and discovery, the increased efficiency is phenomenal" (McLuhan, 1964a, p. x).

However, it must be immediately added here, that just because work in the electronic workplace needs non-authoritarian, playful, environments does not mean that managers, steeped in an Industrial Revolution mindset, will readily see this. They may have to be coerced into seeing work as play and forced to respect the need for democratic workplaces in order to promote creativity. As well, workers will still need to be protected from rear-view managers applying authoritarian practices, favouritism, unjust disciplinary processes, weak job security and inadequate compensation. This means the work world of the future could contain labour unions – if unions also learn to see workplaces as artistic fields of activity (Bélanger, 2001). As well, it cannot be forgotten that we are here discussing the workers who will be allowed to work within the information artform. Many, such as those in the growing sectors of service work, will not. Or they will do so only in a peripheral sense such as in the operation of payment registers. Even some who do work within the information artform will be treated as appendages to machines such as the workers who flip the hamburgers when the machine tells them to do so. One of our goals should be to create jobs within the information world which use the creativity of workers, not treat them, as McLuhan would have put it, as 'servomechanisms' (McLuhan, 1964a, p. 55).

For those who do find creative work within the information artform the future of work may not seem much different than leisure. McLuhan argues that:

> As the age of information demands the simultaneous use of all our faculties, we discover that we are most at leisure when we are most intensely involved, very much as with the artists of all ages. (McLuhan, 1964a, p. 301)

Consciousness: the final extension

What we are doing with the global artform, McLuhan suggested, is developing what may be the final extension. While we toiled under the demands of nature we extended our physical bodies. When we created electric communication systems we extended our nervous system. Now, as we explore the global artform of human-created information, we are on the brink of extending *consciousness*. He argues that: "In electronic fact, automation deepens and enlarges work until it is almost co-extensive with consciousness" (McLuhan, 1964c). The final frontier may not be the physical universe but the realm of awareness the mind has of itself and of the world. McLuhan suggests we may even use consciousness to begin re-shaping, programming, our global artform:

As we move our nervous system out to form a new environment of electric information and service via the computer, it inevitably follows that we are beginning to use consciousness itself as the pattern of programming the new electric environment. (McLuhan, Nevitt, 1970, p. 267)

All this strikes some people as rather fanciful: extending human consciousness, or using consciousness to program our electric environment. But as technologies such as search engines develop, the idea that we are exploring human consciousness, and using it to create our electronic environment, becomes clearer. The mass of Google searches – including all the searches it has ever accomplished and the search dynamics that occur in reaction to current events – provides a record and view of the process by which millions of people think and learn about things they are concerned about. It is not fanciful to say that we can now see the collective consciousness of online humans because we can see it happening and we have a record of it. We can also see it changing. People who learn to rely on search engines think differently. Instead of learning facts, they remember where to find them (Sparrow, Liu, Wegner, 2011). This is a significant change in how we see ourselves thinking, how we perceive our consciousness. It is not a very complicated next step from using what we have learned about online consciousness to manipulate what is searched or design the technologies which enable the searches – in other words: program our electric environment. Furthermore, we should remember that the search engines which exist as we head into the 21st century are mere prototypes of what will come to be in the next fifty years.

What the future of work will be like as we explore and manipulate online consciousness is of course impossible to describe precisely. McLuhan warns us though that: "We are threatened with a liberation that taxes our inner resources of self-employment and imaginative participation in society. This would seem to be the fate that calls men to the role of artist in society" (McLuhan, 1964a, p. 310).

An artistic l'earning kit

While McLuhan is being rightly celebrated as prescient in many ways, our task today should not be to focus on the predictions which came true. Rather, we should use his record as suggesting that his methods can be usefully applied to seeing the effects that will be created by the new technologies that are coming into action. The first step is to consider the trajectories of electric media discussed earlier. The next is to consider the kit of tools McLuhan provided for creatively perceiving and designing technologies. The kit includes the following:

The acoustic-space field approach. The artist works with a field approach that builds awareness of the whole environment in order for discovery and learning to happen. This is in marked contrast to print-biased industrial minds which look for connections happening in particular order. The industrial mind is steeped in the step-by-step logic schemes promoted by the contemplation of the mechanics of print. It sees the hard connections of industrial machinery and demands more connections, not only in

production, but in thinking. This is understandable. Applied industrial knowledge was very successful in producing goods and raising living standards, even if this was too often at the expense of lost lives, alienating work, and reduced humanity. But today we do not work exclusively within the industrial realm. Instead, if we accept McLuhan's concept, many of us work within an artform created by human thinking. And human thinking has different dynamics than industrial production. It is not constrained by step-by-step thinking patterns which demand to see connections between things. It accepts that ideas can come from all directions, prompted by endless, unconnected, stimuli. The difference between industrial and electric thinking is the difference between Newtonian and Einsteinian space. Artists who develop a whole field approach to thinking about the artform around them open themselves to learning and discovery in a rapidly changing world constantly being effected by new and emerging technologies. Meditating on the use of the field, acoustic space approach with the contemplation of, for example, intermediate ideas (ideas that may be absurd but lead to others), brainstorming, playtime, suspended judgement, puns, and other mind-opening exercises can be effective in understanding the electric world of information. The goal is to move the mind out of its habitual ways and open it to new possibilities.

Pattern recognition. In a global artform of vast and increasing amounts of information the only way of acting within it successfully is to search for patterns. McLuhan often refers to the sailor in Edgar Allan Poe's story *A Descent into the Maelström* who saves himself by studying the patterns of the objects sucked into a huge whirlpool that is about to engulf his ship. Pattern thinking, McLuhan wrote, is a form of mythic thinking which looks at information by "building an inventory of effects obtained by the comparison and contrast of developing situations" (McLuhan, Nevitt, 1972, p. 8). Its use allows the artistic l'earner to make sense of swirls of information within the whole. However, people may find it difficult to practice pattern recognition because they are not accustomed to letting their minds play. Play is important, writes McLuhan.

> Difficulty in pattern recognition proceeds from the inability to *play* with problems. In our Western world, with its fixed points of view, it is difficult to scan a whole field. People fear to leap from the logical to the reasonable, from the map and blueprint of hindsight to the play problem that produces insights and breakthroughs. (McLuhan, Nevitt, 1973, p. 16)

Probes. Perhaps the most effective and misunderstood tool McLuhan has provided us is the probe: a question, a statement, a seeming conclusion, that is sent out into debate to see what it provokes. Logan writes: "McLuhan had no compunctions about tossing out an untested or unfinished idea and playing with it to see what could be learned (Logan, 1991, p.100). Federman and de Kerckhove describe a probe, in this way:

> …a probe prods our minds into action, forcing us to stop and think because its effect on our consciousness is so unexpected. As an investigative tool, a probe is invaluable because it

does not necessitate defending a conclusion or pre-conceived notion, nor does it require rigorous, scientific proof. (Federman, M., de Kerckhove, 2003, p. 36)

Figure / ground analysis. A major difficulty in seeing a technology and its effects is that the technology itself becomes the primary focus. The environment it creates is largely ignored. First, because we become fascinated - numbed - by any new extension of ourselves in technologies. Secondly, because it is not until a new technology comes along to grab our attention that the environment of the older medium becomes more clearly seen. To help us see currently numbing technologies and their effects more clearly McLuhan suggested the use of figure /ground analysis. The technology is the figure. The ground is the services and disservices created by the technology. McLuhan described it in this way to an interviewer:

> … each kind of technique or technology, each thing that we associate with technology, necessarily has a large ground of services and disservices associated. Now the ordinary attention is fixed on the figure rather than the ground, on the wheel rather than the huge system of road services necessary to maintain the existence of a wheel or wheel vehicle. With a motocar, most people are interested in the changing designs or patterns of the motorcar. They pay no attention to the huge filling stations and other allied services that are part of the same ground. (Oltmans, 1972)

As an example: Google is the figure. Its ground is the large number of firms that depend on it, the people who use it, what they use it for, the effects it has on scholarly work (allowing easy search of articles, but equally easy ways to plagiarise), the political effect that focused access to global information has on dictatorships, and other consequences. More opportunities for developing new kinds of work may be found in the *ground* that Google creates than in the service itself.

Tetrads. A tetrad is a thought tool rather like brainstorming which is used for thinking creatively about technologies, their effects, their figure /ground configurations and other attributes. McLuhan introduced the concept in two articles written in the 1970s (McLuhan, 1975, pp. 74-78; McLuhan, 1977, pp. 173-179). It was expanded upon in a book published posthumously: *Laws of Media: The New Science* which he co-authored with Eric McLuhan (McLuhan; McLuhan, 1988).

A tetrad consists of four questions. Here is how Federman and de Kerckhove (2003, p. 139) used a tetrad to think about the effects of excessive working hours and the problem of employee burnout.

> *What does the situation extend?* Working hours, number of commitments, personal expectations, accomplishments, comfort zone.

> *What does it retrieve?* Hunter (must constantly hunt or can't eat), slavery, short life span, industrial revolution assembly line, specialists/specialisms.

What does it reverse into? Burnout, frustration, disappointment, anger and non-productivity (time wasted).

What does it obsolesce? Satisfaction/ pride of accomplishment, happiness, sense of ownership, productivity, personal time, relationships.

Stamps (1995, pp,147-150) criticizes the "The New Science" of the tetrad as not being scientific. Theall describes the tetrad as "a poetic aid to memory (mnemopoetic device) that schematizes a 'reading' of an artifact as if it were text (Theall, 2001, p. 71)". The latter view is more valuable. I have used tetrad analysis in my labour education classes at the UN's International Training Centre in Turin, Italy. No two classes produced the same result while applying tetrad analysis to the same topic (thereby not fulfilling the scientific requirement of replicability). But its use did have the effect of promoting discussion and generating ideas. The tetrad exercise can be as useful as the brainstorming method. It lacks, however, brainstorming's final step which is to produce an action plan.

Minding the intervals. McLuhan argued that technologies are metaphors which build bridges between situations. As he told an interviewer: "It doesn't matter whether it's a word or hardware. It's an attempt to relate two situations that are not easily or ordinarily related" (Sohn, 1978). Tie this thought to the idea that the global artform is organically constituted as a whole, and a powerful tool for technology designers is presented. If we know that everything is in relationship with everything else then there must be some relationship between any two existing technologies. McLuhan uses the term *interval* to describe this relationship. The term does not refer to time, but rather to its use in music theory. In music theory an "interval" describes the relationship between the pitches of two notes. They are not connected, they resonate like the two prongs of a tuning fork. Juxtaposing two existing technologies – hardware or software – and looking for how they resonate could lead to ideas for new metaphors, new artforms, new technologies. It is a process of considering older, existing, technologies and relating them in order to produce a new medium.

> Instead of merely discarding traditional forms, the poet and artist and inventor are engaged in supplying the ancient forms with youthful vigour. It is perhaps a type of cultural transplant of organs from one host body or culture to another. At a more commonplace level the "hardware" inventor transfers existing components or technologies from one area, or combination, to another. (McLuhan, Nevitt, 1972, p.139)

The process of technology design is important to consider because workers, as they act within the global artform, may be asked to design or help design technologies to handle the information they are working with. The following section provides an example of how an information technology was designed. It describes the invention of an open source workplace technology I designed while considering McLuhan's trajectories of the electric world's effects and his creative tool kit.

Creating a new workplace technology

Two of the technologies I was using for labour education at the UN's training centre were computer conferencing and podcasting. Computer conferencing is the use of online forums in which text messages are left on a computer system. The messages can be sorted by date, author, topic or connection to the discussion (known as "threading"). Podcasting is the recording of music or speech saved to a computer file and then made available for downloading from an online computer.

McLuhan's concept of technologies as myths bridging two artifacts (in this case computer conferencing and podcasting) was the starting off point for the design of a completely new technology, or as McLuhan would put it, a new artform. The result was, what I have termed, *asynchronous audio-conferencing*.

Asynchronous audio conferencing is the recording and storage of voice messages in a computer conference. (Asynchronous refers to the ability to leave and retrieve messages anytime that is convenient for the user.) A prototype is being used in Akcio - a next generation computer conferencing system (Akcio). To use the system a user records a message with a headphone-microphone set and recording software. The recording is saved as a computer file. The user then goes to the online conferencing system and enters the particular conference he or she is participating in. Then, instead of entering a text message, the user enters the recording. After a number of participants have used the system, the messages can be retrieved in the same fashion that forum messages are retrieved in a text-only system: by date, author, threading and other criteria. In an employee training course the instructor could leave an opening statement in a conference and then ask participants to respond to it orally. Then the whole discussion would be available for playback in many different ways: by topic, author, date or other criteria.

Currently, Akcio users must record messages offline. But the plan is to build voice-recognition and recording capability into the system. The user will be able to give commands to the system, such as: "Open Conference 'A'. Start new message." The system will then be able to record the user's message and respond to the user`s command to "Enter message".

The goal is to have asynchronous audio conferencing available not only for personal computer users, but also for people using mobile phones, especially in the developing world. Mobile phone use in the developing world is much more widespread than the use of personal computers. The potential for worker training provided by mobile phone is significant.

The invention of asynchronous audio-conferencing is an example of studying the interval between two technologies to create a new one. It follows McLuhan's design process that the "inventor transfers existing components or technologies (*in this case computer conferencing and podcasting technologies* – ed.) to another (*namely asynchronous audio conferencing* –ed.)" (McLuhan, Nevitt,

1972, p.139) . The example is also in keeping with McLuhan's view that electric technologies are encouraging us to return to the state of orality in which humankind existed before the invention of the phonetic alphabet and printing. Furthermore, it fits in with his view that consumers are becoming producers because open source technologies, such asynchronous audio-conferencing, allow users to influence their design. By using the system and suggesting improvements users co-create the technology along with the system designers and programmers. In this way, workers become agents of technological design - which brings us back to Balka's argument, presented at the beginning of this essay, that technologies can be seen as the products of social-technological interaction in which humans have agency (Balka, 2000, p.73).

Conclusion

Marshall McLuhan held fast to a cultural and political agenda throughout his career. As presented in *The Mechanical Bride* it was to foster states of awareness which would awaken people to the intolerability of their condition in a society which uses technologies to engender passivity. The awakening happens if artistic methods are used to promote understanding of the effects of technologies which are acting within a human-made artform of information. These methods include paying close attention to the general trajectories of electric media effects and the use of a kit of artistic tools. The trajectories include: visual space thinking being over-ridden by acoustic space thinking; the elimination of margin-centre organization; decentralization; increased speed of activity; reversal of the consumer-producer division; the user as content; greater participation – or the demand for greater participation; discarnate people; the translation of hardware into software; and the creation of infinite amounts of information. The kit of artistic tools includes: probes, figure/ground analysis, tetrads, acoustic space orientation and attention to the intervals between technologies. The global artform of information promotes the worker as artistic l'earner. Respecting the needs and rights of the artistic l'earner demands democracy in the workplace, life-long learning and artistic training. The final frontier for the work of humankind may not the physical universe, but human consciousness explored by artistic l'earners.

In the end, McLuhan's work is most valuable to workers and designers of technologies because it opens up possibilities for them to co-create new technologies and, ultimately, control the global information artform being produced.

Much more work needs to be done by investigators using McLuhan's concepts and tools. How do we train workers to be more artistic? What management patterns need to be implemented? How can the tools provided by McLuhan be used in workplaces? What new technologies could we design using McLuhan's methods? What topics and issues are raised in our working on the extension of human consciousness? These questions must be responded to by working people acting, within the global artform of information, as artists.

References

25

Akcio. http://www.akcio-dev.net/

Balka, E. (2000). Rethinking 'The medium is the message': Agency and technology in McLuhan's writings. *Media Information Australia* (2000) No 94 – February, 2000.

Bélanger, M.

____ (2001). Technology organizing and unions. *e-commerce vs e-commons*. Ottawa. Canadian Centre for Policy Alternatives. Online at: http://www.policyalternatives.ca/publications/reports/e-commerce-vs-e-commons.

____ (2004). Work-based distributed learning. *Encyclopedia of distributed learning.* Distafano, A., Rudestam, K.E., Silverman, R.J. eds. Thousand Oaks, USA: Sage Publications.

Bureau of Labor Statistics. (2010). (http://www.bls.gov/news.release/tenure.nr0.htm). Retrieved June 13, 2011.

Carey, J.W. (1998). Marshall McLuhan `Genealogy and legacy. *Canadian Journal of Communication. Vol. 23 no. 3. Summer 1998.*

CJC. *Canadian Journal of Communication.* Special issue (December 1989).

Clavell, R. (2002). *McLuhan in space: A cultural geography*. Toronto: University of Toronto Press.

Cohn, D.L. (1951). A touch of humor wouldn't hurt. *New York Times,* October 21, 1951. Retrieved June 9, 2011 from: http://writing.upenn.edu/~afilreis/50s/mcluhan-bride.html

Doeden, D.L. (1981). The media are making artists of us all. *Canadian Journal of Communication. Vol.7 no. 3. 1981.*

Economist. (2011). Favelous. Sometimes the best ideas for government are the simplest. *The Economist.* March 17, 2011.

Federman, M., de Kerckhove D. (2003). *McLuhan for managers: New tools for new thinking.* Toronto: Viking Canada.

Gibson, W. (1984). *Neuromancer.* New York: Ace Science Fiction. 4th edition.

Gillespie, R. (1993). *Manufacturing knowledge: a history of the Hawthorne experiments.* Cambridge: Cambridge University Press.

Grosswiler, P. (1998). *Method is the message: Rethinking McLuhan through critical theory*. Montreal: Black Rose Books.

ILO. International Labour Organization.
    http://www.ilo.org/public/english/bureau/inf/download/brochure/pdf/page4.pdf. Retrieved June
    11, 2011.

Jeffrey, L. (1989). The Heat and the light: Towards a reassessment of the contribution of H. Marshall
    McLuhan. *Canadian Journal of Communication.* Special issue (December 1989) 1-29.

Jones, P.J. (2000). 'McLuhanist' societal projections and social theory: Some reflections. *Media
    Information Australia* (2000) No 94 – February, 2000.

Levinson, P. (1999). *Digital McLuhan: A guide to the information millennium*. London: Routledge.

Logan, R.K.

_____ (1991). The axiomatics of Innis and McLuhan. *McLuhan studies,* Vol. 1, 1991.

_____ (2000). *The sixth language*. Toronto: Stoddart.

_____ (2010). *Understanding new media: Extending Marshall McLuhan.* New York: Peter Lang

Look. (1967). The future of education. The class of 1989. *Look,* February 21, 1967.

Marshall, P.D. (2000). The mediation is the message: The legacy of McLuhan for the digital era? *Media
    Information Australia* (2000) No 94 – February, 2000.

McLuhan, H. M.

_____ (1951). *The Mechanical bride: Folklore of industrial man.* New York: Vanguard Press.

_____ (1962). *The Gutenberg galaxy: The making of typographic man.* Toronto: University of Toronto
    Press. Re-printed 1986.

_____ (1964a). *Understanding media: The extensions of man*. New York: New American Library, 1964,
    2nd ed.

_____ (1964b). *Cybernetics and human culture*. National Archives of Canada. MG 31, D 156. Vol. 132,
    file 16.

_____ (1964c). *Note on automation*. National Archives of Canada. MG 31, D 156. Vol. 132, file 3.

_____ (1966). *Marketing, communication and environment: A symposium with Dr. Marshall McLuhan
    at the Faculty Club*, University of California, Berkeley, 21 November 1966. National
    Archives of Canada. MG 31, D 156.Vol. 132, file 62.

_____ (1967). Environment as programmed happening. *Knowledge and the future of man* (Walter Ong, ed.) – correspondence. National Archives of Canada. MG 31, D 156. Vol. 133, file 41.

_____ (1970). *Culture is our business*. New York: McGraw-Hill.

_____ (1971). Innovation is obsolete. *Evergreen Review.* National Archives of Canada. MG 31, D 156.Vol. 135, file 34.

_____ (1972). *The end of the work ethic.* Address to the Empire Club, Toronto, May 31, 1972. National Archives of Canada. MG 31, D 156. Vol. 136, file 32.

_____ (1975). McLuhan's laws of the media. Letter to the editor. *Technology and Culture,* January 1975. National Archives of Canada, MG 31, D 156. Vol. 16, file 1.

_____ (1977). Laws of media. *et cetera,* June 1977. National Archives of Canada. MG 31, D 156. Vol. 140, file 33.

McLuhan H. M., Nevitt, N. (1970). The man who came to listen. *Contributions to business entreprise.* Tony H. Bonaparte, John E. Flaherity, eds. New York: New York University Press.

McLuhan, H. M., Nevitt, B. (1972). *Take today: The executive as dropout*. New York: Harcourt, Brace, Jovanovich

McLuhan, H. M., Nevitt, B. (1973). *De-baiting the systems*. Unpublished manuscript, National Archives of Canada. MG 31, D 156. Vol. 137, file 35.

McLuhan, H. M., McLuhan, E. (1988). *Laws of media: The new science.* Toronto: University of Toronto Press.

MIA. *Media Information Australia* (2000). No 94 – February, 2000.

Miss Chatelaine (1974). An informal interview with Marshall McLuhan. *Miss Chatelaine,* Fall Fashion Issue, 1974. National Archives of Canada. MG 31, D 156. Vol. 138, file 30.

Molinaro, M. McLuhan, C., Toye, Williams, eds. (1987) *Letters of Marshall McLuhan*. Toronto: Oxford University Press.

O'Higgins, P. (1997). Labour is not a commodity — an Irish contribution to international labour law. *Industrial Law Journal*. Vol. 26, no 3.

Oltmans, W.L. (1972). Interview with Marshall McLuhan. Unpublished. National Archives of Canada. MG 31, D 156. Vol. 44, file 60.

Perelman, D. (2008). *ZDNet,* July 2, 2008. (http://www.zdnet.com/blog/careers/five-realities-of-google-or-any-other-workplace-wonderland/108). Retrieved June 12, 2011.

Playboy. (1969). The Playboy interview: Marshall McLuhan, *Playboy.* March 1969.

Sohn, D. (1978). *Conversation with Marshall McLuhan*. National Archives of Canada MG 31, D 156.Vol 141, file 39.

Sparrow, B., Liu, J., Wegner, D. (2011). Google effects memory: cognitive consequences of having information at our fingertips. *Science.* http://www.sciencemag.org/content/early/2011/07/13/science.1207745 Retrieved July 16, 2011

Stamps, J. (1995). *Unthinking modernity: Innis, McLuhan and the Frankfurt School*. Montreal and Kingston: McGill-Queen's University Press.

Sykes, G. (2000). 'Everyone's deep politics began to show': Bursting the acoustic space of Herbert M. McLuhan. *Media Information Australia* (2000) No 94 – February, 2000.

Theall, D.F.

____ 2000. Who/what is Marshall McLuhan. *Media Information Australia* (2000) No 94 – February, 2000.

____ 2001. *The Virtual McLuhan.* Montreal and Kingston: McGill-Queen's University Press.

UAW-CIO Ammunition. (1951). The picture on your mind: psychological motion picture operators project sound moving pictures into your mind by continuous insinuation. *UAW-CIO Ammunition*, 1951. Reprinted in: *McLuhan hot and cool: A critical symposium.* New York: The Dial Press, 1967. Note: Although the article is not signed the author was most likely Lewis Carliner (source: Maria Catalfio, librarian, UAW, personal correspondence)

van Santen, J.P.M. (1972). Interview with Marshall McLuhan. *Success*. National Archives of Canada, MG 31, D 156 Vol. 136, file 19.

Wallace, M., McLuhan, M. (1967). *Marshall McLuhan, Mike Wallace: A Dialogue.* The Diebold Research Program, Professional Paper Series, National Archives of Canada, MG 31, D 156. Vol. 132, file 55.