



McLuhan Extended and the Extended Mind Thesis (EMT)

Robert K. Logan

Department of Physics, University of Toronto
University of Saint Michael's College
The Strategic Innovation Lab – OCAD University
logan@physics.utoronto.ca

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*All media are extensions of some human faculty psychic or physical.
In this electronic age we see ourselves being translated more and more
into the form of information, moving toward the technological extension
of consciousness.*

[Marshall McLuhan, Author of *Understanding Media: Extensions of Man*]

Abstract

We develop complementary connections between McLuhan's media ecology notion of media as 'extensions of man' and the Extended Mind Thesis of Andy Clark.

Keywords: Marshall McLuhan; Andy Clark; Extended Mind Thesis; Media Ecology; Alphabetic Writing

Introduction

Marshall McLuhan (1964) in *Understanding Media: The Extensions of Man* (UM) developed the hypothesis that media and technologies are extensions of the human body and psyche or mind. Andy Clark also developed a somewhat similar hypothesis, namely, that our physical tools can become extensions of our mind. McLuhan actually talked about our brain being outside our skull in the following quote

Electromagnetic technology requires utter docility and quiescence of meditation such as befits an organism that now wears its brains outside its skull and its nerves outside its hide. Man must serve his electric technology with the same servo-mechanistic fidelity with which he serve his cora-

cle, his canoe, his typography, and all other extensions of his physical organs. But there is this difference, that previous technologies were partial and fragmentary, and the electric is total and inclusive (McLuhan 1964: 64).

My first introduction to the Extended Mind Thesis (EMT) came from hearing a lecture of Andy Clark at the University of Toronto in 2004, which was followed up almost immediately with a reading of Andy Clark's *Being There* (1997) and *Natural-Born Cyborgs* (2003). Having exchanged email addresses with Andy I fired off the following email to him after reading his books.

What struck me as I read *Natural-Born Cyborgs* was the overlap of your ideas with those of Marshall McLuhan with whom I worked. Let me give you two examples: You wrote:

"It is the mind-body-scaffolding problem. It is the problem of understanding how human thought and reason is born out of looping interactions between material brains, material bodies, and complex cultural and technological environments. We create these supportive environments, but they create us too."

The last sentence parallels a famous quote of McLuhan's: "We shape our tools and thereafter our tools shape us."

Another parallel is between a quote on page 30: "The more closely the smart world becomes tailored to an individual's specific needs, habits, and preferences, the harder it will become to tell where that person stops and this tailor-made, coevolving smart world begins."

This is similar to McLuhan's notion that tools are extensions of our body and media extensions of our psyche plus the following quote from *Understanding Media* (McLuhan 1964: 64):

"In this electric age we see ourselves being translated more and more into the form of information, moving toward the technological extension of consciousness. [...] By putting our physical bodies inside our extended nervous systems, by means of electric media, we set up a dynamic by which all previous technologies that are mere extensions of hands and feet and bodily heat-controls - all such extensions of our bodies, including cities - will be translated into information systems."

Much to my delight, in a response to my email Andy acknowledged the parallels, which he said had been pointed out to him on a number of occasions. He went on to say that although he had never read McLuhan himself he believed that he had "been indirectly influenced by these ideas through many filtered pathways."

The parallel to McLuhan's work with the Extended Mind Thesis surfaces in my own work which is directly influenced by the seven years I spent collaborating with Marshall McLuhan. As I will describe in greater detail below, based on my work with McLuhan I developed a model for the origin of verbal language, which I called the Extended Mind Model, long before I encountered the EMT. In fact, in 1997, the year before the paper by Clark and Chalmers (1998) appeared with the title "The Extended Mind," I presented a paper (Logan 1997) entitled "The Extended Mind: Understanding Language and Thought in Terms of Complexity and Chaos Theory" to the 7th Annual Conference of *The Society for Chaos Theory in Psychology and the Life Sciences* at Marquette University in Milwaukee, Wisconsin, on August 1, 1997.

It is my intention in this paper to expand on the theme that there is a parallel between Andy Clark's EMT and the body of work that emerges from the thinking of Marshall McLuhan and his notion that media are "extensions of man." I will examine first McLuhan's own body of writing and then my own contributions that were in one instance formulated with McLuhan (McLuhan & Logan 1977) and my body of work (Logan 1997, 2000, 2004a, 2004b, 2007 & 2010) since the passing of McLuhan that was directly influenced by him and, hopefully, extends his legacy.

McLuhan's Notion That Media Are "Extensions of Man"

One of the central themes of Marshall McLuhan was his notion that our technologies and media are extensions of our bodies and our psyches. McLuhan regards all technologies as media and as extensions of our bodies, but treats communication media as a special case - namely, as extensions of our psyche. We intend to show that McLuhan's notion that media are 'extensions of man' foreshadowed the Extended Mind Thesis (EMT) as first formulated by Andy Clark and David Chalmers (1988) in their seminal article "The Extended Mind," and then developed more fully by Clark in his *Natural-born Cyborgs* (2003) and *Supersizing the Mind* (2008). We will also show that the subsequent development of McLuhan's notion of media as extensions of man by the author (Logan 2004a, 2004b, 2007) also parallels the EMT.

We begin our study by compiling and discussing the many instances in which McLuhan talks about technologies and communications media as extensions of man. First, a word about McLuhan's vocabulary. McLuhan makes no distinction between technologies and tools and his use of the term media. All technologies, all tools, all forms of communication are media in the way that McLuhan uses the term. Our tools, technologies and means of communication are media in the sense they mediate our interactions with our environment, both natural and human. McLuhan uses the term 'man' in his oft used expressions such as 'extensions of man' or 'the making of typographic man' to desig-

nate humankind. At the time he wrote, the use of ‘man’ instead of ‘humans’ was not yet politically incorrect.

The words ‘extend’, ‘extensive’ and ‘extension’ appear no less than 93 times in his *Gutenberg Galaxy: The Making of Typographic Man* and 367 times in his *Understanding Media: Extensions of Man*. He continued to use the term in the many books he published after these two canonical books that made him famous. Here is a collection of quotes that illustrate how he made use of the concept beginning with one of the central theses of his body of work: “All media are extensions of some human faculty psychic or physical... The wheel is an extension of the foot...the book is an extension of the eye... clothing, an extension of the skin... electric circuitry, an extension of the central nervous system (McLuhan & Fiore 1967: 26-40).” McLuhan’s notion of the intimate relation between man’s body and his technology is paralleled by a similar notion of Clark’s (2003: 195), namely, that, “The drive toward biotechnological merger is deep within us—it is the direct expression of what is most characteristic of the human species.”

For McLuhan, media of communication are regarded as extensions of our psyche or nervous system. The notion that technologies and media are extensions of humans is central to McLuhan’s description of the dramatic and radical change he saw taking place as electric technologies began to replace mechanical ones.

After three thousand years of explosion, by means of fragmentary and mechanical technologies, the Western world is imploding. During the mechanical ages we have extended our bodies in space. Today, after more than a century of electronic technology, we have extended our central nervous system itself in a global embrace, abolishing both space and time as far as our planet is concerned. Rapidly, we approach the final phase of the extension of man – the technological simulation of consciousness, when the creative process of knowing will be collectively and corporately extended to the whole of human society, much as have already extended our senses and our nerves by various media. Whether the extension of consciousness, so long sought by advertisers for specific products, will be "a good thing" is a question that admits of a wide solution. There is little possibility of answering such questions about the extensions of man without considering all of them together. Any extension, whether of skin, hand, or foot, affects the whole psychic and social complex (McLuhan 1964: 19).

Not only does McLuhan foreshadow Andy Clark’s EMT that our tools are extensions of our mind, but he goes even further than the EMT in the sense that he claims that the mind is extended into “a global embrace,” so that our individual minds are extended to the whole of humanity or, in his words, “the whole of human society.” This is even more radical than the EMT. What McLuhan is suggesting is that through electricity each individual psyche or

mind is part of a collective consciousness on a global scale, as opposed to the collective conscious defined by Durkheim as the shared beliefs and moral values which bind the members of a society, where a society is defined as a collection of humans that interact with each other locally. The first such societies were pre-literate and bound together those folks that could converse orally with each other directly face to face. With writing, the size of the society expanded to all those that could be reached by the written word and shared a common language and dialect. With the printing press, along with newspapers, the size of a society expanded to the dimensions of a nation state. And then with electric communication, as McLuhan pointed out, the dimension of society expands to a global dimension and created what he called a "Global Village." This is even more the case with the Internet that allows each of us with access to the Net to be instantaneously in touch with any point on the globe.

In the electric age, when our central nervous system is technologically extended to involve us in the whole of mankind and to incorporate the whole of mankind in us, we necessarily participate, in depth, in the consequences of our every action. It is no longer possible to adopt the aloof and dissociated role of the literate Westerner (McLuhan 1964: 20).

The notion of media as an extension of man plays a central role in McLuhan's formulation of his famous trademark one-liner, "the medium is the message."

The medium is the message. This is merely to say that the personal and social consequences of any medium - that is, of any extension of ourselves - result from the new scale that is introduced into our affairs by each extension of ourselves, or by any new technology (McLuhan 1964: 23).

Both McLuhan and Clark see an intimate link between the evolution of technology and our biological makeup. McLuhan (1964: 165) states it simply in terms of his notion that our technologies are extensions of our body: "The transformations of technology gave the character of organic evolution because all technologies are extensions of our physical being."

Clark (2003), who suggests that we are extension of our technologies in the sense that tools extend our cognitive capabilities, suggests the linkage in these terms:

At first, creating a product that can DO THE JOB is hard enough, let alone aiming for products nicely fitted to brains like ours. As time goes by, however, the vendors must seek to extend their market beyond the gung ho early adopters and technophiles. They will need to sell to the average user who simply wants a cheap, reliable, and easy-to-use tool. The technological product then comes under cultural-evolutionary pressure to increase its fitness by better conforming to the physical and cognitive strengths and weaknesses of biological bodies and brains. In quasi-evolutionary terms,

the product is now poised to enter into a kind of symbiotic relationship with its biological users. It requires widespread adoption by users if its technological lineage is to continue, and one good way to achieve this is to provide clear benefits at low cognitive and economic costs (2003: 39).

One large jump or discontinuity in human cognitive evolution seems to involve the distinctive way human brains repeatedly create and exploit various species of cognitive technology so as to expand and re-shape the space of human reason. We—more than any other creature on the planet—deploy nonbiological elements (instruments, media, notations) to complement our basic biological modes of processing, creating extended cognitive systems whose computational and problem-solving profiles are quite different from those of the naked brain. Our discussion of human mathematical competence displays this process in a kind of microcosm. Our distinctive mathematical prowess depends on a complex web of biological, cultural, and technological contributions (2003: 78).

The Evolution of Media and Technologies: Extending the Extensions of Man

The notion that one technology or medium leads to another is an idea that McLuhan first formulated in *Understanding Media*, and it forms the basis for media ecology.

Physiologically, man in the normal use of technology (or his variously extended body) is perpetually modified by it and in turn finds ever-new ways of modifying his technology. Man becomes, as it were, the sex organs of the machine world, as the bee of the plant world, enabling it to fecundate and to evolve ever-new forms. The machine world reciprocates man's love by expediting his wishes and desires, namely, in providing him with wealth (McLuhan 1964: 55-56).

Clark (1997: 198) developed a similar model for the evolution of technology and media. He proposed that the discontinuity in the cognitive skills between humans and nonhuman primates, while affected by some subtle changes in the structure of the brain, are, in fact, due primarily to the human ability to exploit language and culture as external resources or “cognitive scaffolds,” a term he makes liberal use of to great effect. An existing technology provides an extension of our cognitive abilities that allows us to develop more advanced forms of that technology. He defined scaffolding in the following way:

We have called an action ‘scaffolded’ to the extent that it relies on some kind of external support. Such support could come from the use of tools or from the exploitation of the knowledge and skill of others; that is to say, scaffolding denotes a broad class of physical, cognitive, and social aug-

mentations—augmentations that allow us to achieve some goals that would otherwise be beyond us (Clark 1997: 194).

Clark's scaffolding entails physical, cognitive, and social augmentations. Clark's scaffolding is basically what McLuhan termed "an extension of man." But there is a McLuhanesque flip to this idea, namely, that through the use of our tools we actually become extensions of our tools. "To behold, use or perceive any extension of ourselves in technological forms is necessarily to embrace it. By continuously embracing technologies, we relate ourselves to them as servo-mechanisms" (McLuhan 1964: 55). At first, technology serves as an extension of humankind and then suddenly a flip occurs and humankind is transformed into an extension of its technology. Clark (1997: 214) expresses a similar thought. "There is, after all, a quite general difficulty in drawing a line between a user and a tool."

Another parallel with McLuhan is the similarity of the following thought of Clark's (2003) from his book *Natural-Born Cyborgs* and McLuhan's (1967) oft quoted remark "We shape our tools and thereafter our tools shape us" that actually was first formulated by John Culkin (1967), but used frequently by McLuhan.

It is the mind-body-scaffolding problem. It is the problem of understanding how human thought and reason is born out of looping interactions between material brains, material bodies, and complex cultural and technological environments. We create these supportive environments, but they create us too. (Clark 2003: 11)

We can see how McLuhan foreshadows Clark's notion of a "natural-born cyborg" if we compare McLuhan's 40-year old quote with Clark's definition of a "natural-born cyborg." McLuhan (1964: 64) wrote:

In this electric age we see ourselves being translated more and more into the form of information, moving toward the technological extension of consciousness. [...] By putting our physical bodies inside our extended nervous systems, by means of electric media, we set up a dynamic by which all previous technologies that are mere extensions of hands and feet and bodily heat- controls—all such extensions of our bodies, including cities—will be translated into information systems.

Whereas Clark's (2003: 31) definition of a "natural-born cyborg" reads as follows:

The biological design innovations that make all this possible include the provision (in us) in an unusual degree of cortical plasticity and the (related) presence of an unusually extended period of development and learning (childhood). These dual innovations (intensively studied by the new research program called 'neural constructivism') enable the human brain,

more than that of any other creature on the planet, to factor an open-ended set of biologically external operations and resources deep into its own basic mode of operation and functioning. It is the presence of this unusual plasticity that makes humans (but not dogs, cats, or elephants) natural-born cyborgs: being primed by Mother Nature to annex wave upon wave of external elements and structures as part and parcel of their own extended minds.

According to the arguments made by Clark and McLuhan, not only are languages, media and technologies extensions of the human mind, but so too is culture which acts as an “extension of man” for McLuhan (1964) and “scaffolding... a broad class of physical, cognitive, and social augmentations” for Clark (1997, 2003).

We now turn to a comparison of the EMT with my own work, which may be regarded as an extension of the work of Marshall McLuhan. In fact, the first item we consider, the alphabet effect, was first developed in a paper I wrote with McLuhan in 1977 entitled “Alphabet, Mother of Invention” (McLuhan & Logan 1977). The other books that I refer to were all done on my own, but strongly influenced by the seven years I spent collaborating with McLuhan.

The Alphabet Effect (Logan 2004a)

Joseph Needham (1969) claimed that the Chinese contribution to the development of abstract science in the West was significant. He argued that many practical inventions were transferred from China to the West that stimulated European science. His claim led naturally to the question: Why did abstract theoretical science begin in the West and not in China itself?

I explained this paradox by suggesting that monotheism and codified law, two features of Western culture absent in China, led to a notion of universal law, which influenced the development of abstract science in ancient Greece where the pre-Socratic philosophers described the universe in terms of a single organizing principle, which for Thales was water, for Anaximander it was *apeiron*, the grey neutral substance from which opposites emerged, for Anaximenes it was air and for Heraclitus it was fire (Logan 2007). The Chinese had law but it was not codified and they had their own form of spirituality but it did not involve the idea of one god who created the universe as is explained in (Logan 2007). I first shared this hypothesis with Marshall McLuhan at a lunch in 1974. He agreed with me but pointed out that I had failed to take into account the phonetic alphabet writing system, a feature of Western culture not found in China. The alphabet, McLuhan claimed, had also contributed to the development of Western science. Realizing that our explanations complemented and reinforced each other, we combined them in a paper entitled "Al-

phabet, Mother of Invention" (McLuhan & Logan 1977) to develop the following hypothesis:

Western thought patterns are highly abstract, compared with Eastern. There developed in the West, and only in the West, a group of innovations that constitute the basis of Western thought. These include (in addition to the alphabet) codified law, monotheism, abstract theoretical science, formal logic, and individualism. All of these innovations, including the alphabet, arose within the very narrow geographic zone between the Tigris-Euphrates river system and the Aegean Sea, and within the very narrow time frame between 2000 B.C. and 500 B.C. We do not consider this to be an accident. While not suggesting a direct causal connection between the alphabet and the other innovations, we would claim, however, that the phonetic alphabet (or phonetic syllabaries) played a particularly dynamic role within this constellation of events and provided the ground or framework for the mutual development of these innovations.

The alphabet is not only a tool for written communication, but it also teaches the lessons of abstraction, analysis, coding, decoding and classification. The alphabet is both a communication medium and an informatic tool. The alphabet, monotheism, codified law, abstract science, deductive logic are media that interacted with each other and co-evolved. The alphabet is a medium that propagates an analytic and abstract form of organization that contributed to the science- and logic-based nature of Western civilization (Logan 2004a).

The parallels with Clark's EMT is that writing in general, and the alphabet in particular, extend one's memory and, hence, one's mind. It allows for the ratcheting of ideas as an author is able to build on the writing of an earlier author and, hence, writing becomes a scaffolding, to use Clark's vocabulary. Another effect of writing is that it objectifies one's thoughts, as one can return to what has been written earlier and evaluate it freshly. Writing also provides an environment in which one can develop one's thoughts through written words and diagrams. In *Supersizing the Mind* (2008), Andy Clark relates the story of how the historian Charles Weiner saw physicist Richard Feynman's notes as a "record" of his work. But Feynman disagreed, insisting that the notes were where he actually developed his idea and were not a record of the work, but the work itself.

The alphabet provides all the scaffolding of writing as it is a particular form of writing, but it provides much more as well. Alphabetic writing is the most abstract form of writing and it is within this medium that abstract science and deductive logic developed. It also promotes analysis, because each time I wish to write with an alphabet I must analyze the word I wish to write into its basic phonemes and then represent them with meaningless signs. Writing is, thus, a form of coding and reading a form of decoding. The alphabet also teaches

the lesson of classification as all words can be ordered alphabetically. The alphabetic and phonetic form of writing, I would claim, became the scaffolding for monotheism, codified law, abstract science and deductive logic, and each of these, in turn, became the scaffolding for other developments of the alphabetic mind, such as computing and the Internet that are discussed next.

The Sixth Language (Logan 2004b)

The *Alphabet Effect* taught me that phonetic writing acts as both a medium of communication and as an informatic tool. I discovered the same is true of computers and quickly realized that spoken language was not only a medium of communication but also the medium in which we humans framed our abstract thoughts. I came to the conclusion that: language = communications + informatics.

Writing and mathematical notation were a product of the organization of economic information by accountants and civil servants in Sumer. They had to deal with an information overload resulting from keeping track of the tributes from farmers in the form of agricultural commodities needed for redistribution to irrigation workers. Schools emerged to teach the new skills of reading, writing and arithmetic. The teachers became scholars and another information overload ensued. Science as a form of organized knowledge emerged to deal with this information overload. Science, in turn, led to another overload in terms of industrial science-based technology. This overload was remedied by computing, which gave rise to another information overload that was finally remedied by the Internet.

These notions led me to postulate that speech, writing, mathematics, science, computing and the Internet form an evolutionary chain of six languages. Each language possesses its own unique semantics and syntax. Each new language emerged as a response to the chaos of the information overload that the previous languages could not handle.

The evolution of language from speech through writing, math, science to computing and the Internet is an example of the scaffolding notion developed within the framework of EMT and leads us to the question of how the base of the scaffold, speech, came into being.

The Extended Mind: The Origin of Language, the Human Mind and Culture (Logan 2007)

If speech gave rise to the five different forms of notated language listed above, the question naturally arises as to how spoken language came into being. I hypothesized that speech emerged as the bifurcation from percepts to concepts. It arose as a response to the chaos associated with an information overload that ensued from the increased complexity in hominid life, which included:

- 1) Tool making and use;
- 2) The control of fire;
- 3) The social intelligence needed to maintain the hearth;
- 4) Food sharing;
- 5) Group foraging and hunting;
- 6) Mimetic communication, which incorporates hand signals, gestures, body language and vocalization.

As the complexity of hominid life increased, the percept-based brain alone could no longer cope. There emerged, as a result, concepts in the form of our first spoken words and this, in turn, led to the human concept-based mind, which was capable of abstract symbolic thought. Speech represented a bifurcation from percepts to concepts. Our first words became concepts, acting as strange attractors for the percepts associated with those words. The word water, for example, unites all our percepts of the water we drink, wash with, cook with, rain, melted snow, lakes, and rivers with one concept represented by the word water. Words act as the medium for abstract thought. Abstract thought is as much silent speech as speech is vocalized thought.

Merlin Donald (1991) claimed that mimetic communication was both intentional and representational, and was the cognitive lab in which verbal language developed. If mimetic communication was such a good communication system why did the need for verbal language arise? Spoken language made possible the following survival tools:

- 1) conceptualization,
- 2) symbolic, abstract thought and
- 3) planning by allowing for thought about objects and actions that are not in the immediate perceptual field.

Before language the brain was basically a percept processor. With language the brain became capable of conceptualization and hence bifurcated into the human mind. The emergence of verbal language represents three simultaneous bifurcations:

- 1) the bifurcation from percepts to concepts,
- 2) the bifurcation from brain to mind, and
- 3) the bifurcation from archaic Homo sapiens to full-fledged human beings.

In short: Mind = Brain + Language, so that in my *Extended Mind* work language extended the brain, which I characterize as a percept processor, yet transformed by language into a mind capable of conceptualization, planning and all the abstract arts and science developments of the human mind. It also extended our hominid ancestors into fully human *Homo sapiens sapiens*.

Understanding New Media: Extending Marshall McLuhan

I want to develop an understanding of digital "new media" and their impact using the ideas and methodology of Marshall McLuhan. The "new media" are changing our world as well as the older media that McLuhan (1964) studied in *Understanding Media: Extensions of Man*. The Internet and the digital media that accompany them such as the Web, personal computers, smart phones, tablets, and their apps are the scaffolds of our Digital Knowledge Era.

In *The Sixth language*, I identified five characteristics of the Internet which apply with equal validity to the "new media" and explain their success and rapid adoption. The five characteristics are:

1. two-way communication
2. ease of access to and dissemination of information
3. continuous learning
4. alignment and integration, and
5. community.

In addition to these five characteristics I have also identified nine other characteristics of "new media". They are:

6. portability and time flexibility (time shifting), which provide their users with freedom over space and time
7. convergence of many different media so that they can carry out more than one function at a time as is the case with the camera cell phone that operates as phone but can also take photos and transmit them
8. interoperability
9. aggregation of content
10. variety and choice to a much greater extent than the mass media that preceded them
11. the closing of the gap between (or the convergence of) producers and consumers of media

12. social collectivity and cooperation

13. remix culture; and

14. the transition from products to services.

These are the 14 messages of digital media that scaffold our interactions with data, information and knowledge, and thereby extend our minds.

Conclusion

In conclusion, I believe that I have established a link between media ecology, as first formulated by Marshall McLuhan and later developed by myself and other media ecologists, with Andy Clark's *Extended Mind Thesis*. Media Ecology and the Extended Mind Thesis each provide its own unique perspective on the working of the human mind and psyche, and each complements the other.

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