Extended Mind Ideas of McLuhan, Clark and Logan

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Clark's work while not derived from the work of Marshall McLuhan does parallel McLuhan's notion that media, tools, technologies are "extensions of man"

McLuhan also believes that the mind also operates at times outside the skull. McLuhan wrote:

All media are extensions of some human faculty psychic or physical.

Now man is beginning to wear his brain outside his skull and his nerves outside his skin; new technology breeds new man.

Clark's examples of extensions of the mind center around physical artifacts, such as books, watches, cell phones, digital media, maps, written texts, written plans, calculators, paper, pen. But in addition to these physical tools Clark suggests that abstract social and symbolic tools also scaffold the brain and hence extend the mind. He proposes what makes us humans so cognitively capable is not just the structure of our brain but rather their "amazing capacities to create and maintain a variety of special external structures (symbolic and social-institutional" i.e. language and culture. I will focus on these social and cultural structures that extend the mind. I will also propose that fellow humans as the following argument suggests.

If one’s smart phone brings one information from the Internet it is clearly according to the Clark’s Extended Mind Thesis an extension of one’s mind.

If the same smart phone brings one information from a friend speaking to you by voice using the telephone feature of the smart phone it is clearly according to the EMT an extension of one’s mind.

If the same friend brings one information by voice directly in a face-to-face interaction without the use of the smart phone then that friend is clearly an extension of one’s mind.

Therefore - all of our social contacts are extensions of our mind according to the EMT. If the people I communicate with are extensions of my mind then the following are also is an extension of my mind: culture (C), language (L) organization (O), science (S), economics (E), and technology (T), which scaffold so many of my cognitive activities. I call this set of extension CLOSET.

The elements of CLOSET are both external in origin to the brain but they become incorporated and stored in the brain. This differs from the role of external tools which are clearly outside the brain.

The Extended Mind: The Emergence of Language, the Human Mind and Culture

Speech emerged as the bifurcation from percepts to concepts and a response to the chaos associated with the information overload that resulted from the increased complexity in hominid life, which included

- Tool making and use;
- Control of fire;
- Social cooperation to maintain the hearth;
- Food sharing and altruistic behaviour;
- Group foraging and hunting;
- Mimetic communication (gesture, hand signals, body language and vocalization)

As complexity increased the percept-based brain couldn’t cope—it needed concepts for abstract thought

Speech represented a bifurcation from percepts to concepts

Our first words were our first concepts

They acted as strange attractors for the percepts associated with those words

The word water unites our percepts of the water we drink, cook with, wash with, rain, melted snow, lakes, and rivers

Thought is as much silent speech as speech is vocalized thought.

Merlin Donald claims that mimetic communication was the cognitive lab in which verbal language developed and that it was intentional & representational

If it was such a good communication system why was there a need for verbal language?

It was useful for:
1. conceptualization,
2. symbolic, abstract thought,
3. planning and
4. storing information.

By allowing for thought about objects and actions not in the immediate perceptual field language permits planning

Mind = Brain + Language

Before language the brain was basically a percept processor

With language the brain becomes capable of conceptualization and hence bifurcates 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,
3. the bifurcation from archaic Homo sapiens to full fledged human beings (Logan 2007).

Language emerges from sequential learning and processing – it is an organism that has had to adapt itself "through natural selection to fit a particular ecological niche: the human brain." (Christiansen 1994)

Both language and culture are symbolic. Like language, culture evolved to fit eco-niche of human brain and therefore culture also acts like an organism.

What is Information?

We are swimming in a sea of information but do we really understand what is information.

A project that I engaged in with a number of systems biologists provided an interesting perspective on this question.

Let me first summarize:

Propagating Organization: An Enquiry

by Stuart Kauffman, Robert K. Logan, Robert Este, Randy Goebel, David Hobill and Ilya Shmulevich
Biology & Philosophy 23: 27-45.

Our broad aim was to understand propagating organization as exemplified by the vast organization of the coevolving biosphere.

The cell operates as an information processing unit, receiving information from its environment, propagating that information through complex molecular networks, and using the information stored in its DNA and cell-molecular systems to mount appropriate responses.

We argue that Shannon information does not apply to the evolution of the biosphere because one cannot prestate all possible Darwinian preadaptations or the ensemble of possibilities and hence their entropy cannot be calculated.

According to the Shannon definition of information a structured set of numbers like the set of even numbers has less information than a set of random numbers because one can predict the sequence of even numbers. By this argument a random soup of organic chemicals would have more information that a structured biotic autonomous agent.

The biotic agent has more meaning than the soup, however. The living organism with more structure and more organization has less Shannon information. This is counterintuitive to a biologist's understanding of a living organism. We therefore conclude that the use of Shannon information to describe a biotic system would not be valid. Shannon information for a biotic system is simply a category error.

A living organism has meaning because it is an autonomous agent acting on its own behalf. A random soup of organic chemicals has no meaning and no organization. We may therefore conclude **the meaning of life is organization—organization that propagates.**

The Relativity of Information

You may legitimately ask the question "isn't information just information?", i.e., an invariant like the speed of light. Our response to this question is no, it is relative. Instructional or biotic information is a useful definition for biotic systems just as Shannon information was useful for telecommunication channel engineering.

Thus we identify the information in living organisms with the organization of constraints that allow an organism to capture energy from the environment for their growth and replication. A living organism propagates its organization, which constitutes its information.

We therefore conclude that constraints are information and information is constraints, which we term as instructional information because this is its function and we want to distinguish it from Shannon information.

The constraints are the organization of the living organism and therefore the organization is the information and vice versa.

We next note that biotic information is not symbolic but is embedded in the biomoleules of which the living organism is composed. Biotic information cannot be separated from the medium in which it is instantiated. DNA does not symbolize RNA but rather catalyzes its creation.

And likewise RNA does not symbolize proteins but rather catalyzes its creation.
And the same with proteins they are not symbols but enzymes.

One of the characteristics of biotic information is that it is instantiated materially whereas symbolic information and Shannon info can move from one medium to another. For biotic information the medium is the message in the McLuhan sense and it is also the content. The medium is the content and the content is the medium. Whereas for symbolic info the medium and its content are separate.

We humans deal with 3 kinds of info – genetic, percepts , and concepts (symbolic)

Human Symbolic Forms of Propagating Organization

The propagation of organization is not only a characteristic of living organisms but also a number of abstract, symbolic, extra-somatic, non-material, non-extensive mental activities of humans including culture, language, organization, science, economics and technology (CLOSET). Each contributes to the ability of the human organism to find free energy needed for the work of metabolism and replication.

You might want to claim that technology, economics, organizations & culture are all physically instantiated and are not symbolic. What I claim is that the organization of these physical artifacts is what is symbolic and that organization propagates itself, that it evolves and behaves like an autonomous agent or a living organism. Consider for example one of the elements of culture namely science. It is purely symbolic and without a physical instantiation.

What about the claim that language, culture, science, technology, the economy, and governance are like living organisms that evolve by Darwinian evolution that can be summarized as descent, modification and selection.

Let’s consider science. Every theory starts from some previous theory and adds some new element, i.e. a modification. Then it by the selection of the science community that a new paradigm emerges as explained by Kuhn (In Structures of Scientific Revolutions), who regarded the evolution of science and biological organisms to be parallel.

Science evolves by descent, modification and selection.

Let’s next consider technology. No tool starts from scratch. Every inventor starts with some previous tool or tools and introduces some modifications that the marketplace of users then selects - see George Basalla – The Evolution of Technology

Technology evolves by descent, modification and selection.

No way of predicting evolution of technology – no one foresaw impact of the many Internet successes and in many cases they started out as something different than what they wound up as.

Johnson and Earle in the Evolution of Human Societies show that a similar pattern of evolution exists for the econosphere. Human societies based on symbols evolved from extended families, to clans headed by a big man to tribes headed by a chief to the state headed by various forms of government adapting to pressures from increasing populations. Each new form of governance incorporated elements from the form it descended from. Family is still the basic unit of society. Descent, modification and selection once again.

Incomplete Nature – Terrence Deacon

The book not easy to read or explain contains the paradox that something that is absent, in fact, gives rise to the most critical things for human existence, namely life and mind.

Constraints create the condition for what is absent. It is where the system cannot go. . "Constraints don't do work, but they are the scaffolding upon which the capacity to do work depends (p. 419)." It is constraints acting on matter that gives rise to the unique features of life and sentience. "There is more here than stuff. There is how this stuff is organized and related to other stuff (p. 544)."

Deacon defines three types of physical interactions: thermodynamics, morphodynamics and teleodynamics.

Thermodynamics involves the dissipation of organization and is familiar to all.

Morphodynamics involves self-organization as is the case with a Bernard cell, autocatalysis and the construction of cell membranes.

Deacon argues that biological systems rely on a special form of interdependency between complementary morphodynamic processes in order to generate their constraints internally. To exemplify this he develops a simple and empirically testable molecular model involving two morphodynamic processes which are ubiquitously present in all organisms, namely the self-assembly of cellular membranes and the autocatalysis of organic compounds so essential to life and its ability to reproduce itself. These systems can only persist as long as the conditions that created them hold. If the heat differential between the two surfaces of the liquid is not maintained the Bernard cells collapse. If the materials needed for autocatalysis become depleted the autocatalysis halts.

But if the auto-catalysis takes place within the cell membrane so that the structures created by auto-catalysis are maintained then the system enters into a teleodynamic state and system acts in its own interest developing a sense of self.

Living things act in their own self interest in that they are “self-creating, self-maintaining, self-reproducing, individuated systems.”

I have extended Deacon’s model and argue that the same teleodynamic features of living systems pertain to culture, language, organizations, science, economics and technology.

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