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Information technology within society's evolution

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ABSTRACT

Communication is the foundation for social interaction and therefore society itself is based on communication. This means that every huge change that humanity has experienced derives from a technological discovery related to communication. As a way of studying the impact of technology in society and its power to influence human and natural environments, we propose to analyze how communication technologies have helped transform society as a whole. “Communications are the basic elements of social systems”: Starting from this Luhmanian proposal and the theoretical approach of Social System's Theory, this paper offers an analysis based on the impact that communication technology has had on social development over time. Language and writing, as the first communication techniques, have been followed by a series of technologies, such as printing, telephone, radio, television, internet and cell phones, which are nowadays smarter than ever [37]. These new technologies have increased the amount of communications, making world society more complex than ever and accelerating social changes. This last observation introduces the possibility of proposing the arrival of a new era.

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1. Introduction: social evolution and communication

Society is based on communications ([20]: 64). This means that humanity itself started when our ancestors became human through language. This also means that every huge change that humanity has experienced derives from a technological discovery related to communication. For this paper, a detailed survey of societal evolution is unnecessary. Evolution proceeds slowly, accumulating variations in system elements; herein, we consider unexpected, discordant communications. After this, selection takes place in relation to the structures of the system – that is, expectations that guide communication. Selection is

made by considering the expected communication advantages; among those unexpected, discordant communications, those that yield anticipated structures are preferred over communications with unexpected consequences. Variations that do not generate expectations of guiding communication are rejected. Finally, the relationship between society and its environment is re-stabilized, which enables sustainable expectations. Therefore, sustainable expectations allow these communications to have a place in the everyday lives of human beings and make them possible new ways of organizing to connect among themselves and refer to a non-human environment. This theory implies that defining evolution as a series of episodes is artificial ([20]: 358–359). For this reason, we must assume that these theories are vital to identify key moments in the evolution of human society and that they possess an artificial character, like every other theory about the “happening of life” in which life merely happens, disregarding every explanation ([24]: 88).

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While humans originated over three million years ago ([23]: 50), articulated language among humans arose approximately thirty-five to forty thousand years ago with the *Homo sapiens* [9]. While previous hominids developed a communication system for coordination in building cabins as well as using fire and fashion tools, communication only referenced the contemporary conditions and included shouts and general signals, the particular meaning of which depended on the moment. The same danger cry was used to alert a group to a pack of wild animals, a predator, an earthquake or a prairie fire, and the same food signal was used to indicate edible berries, a small animal for capture or the carrion abandoned by a tiger, after satiating its hunger.

Articulated language allowed communication to create abstractions from the physical context and concrete situations from which it was produced [21]. It allowed hunters to coordinate actions in advance to enhance success; without seeing prey, they would agree on their tactics in case prey would show up. Articulated language facilitated abstract thinking and oral transmission of traditions and knowledge accumulated across generations. Mankind inhabited earth and tried to find reasons for everything that would surround it. Humans cultivated the earth, becoming farmers, and they managed to raise and move with cattle as nomads in search of pasture.

One of the most notable inventions in articulated language was negation, which was a highly conceptual invention, and needed a great capacity of abstraction because it is entirely artificial; there is no such thing in nature as “no”, and nature does not have a “no” equivalent. In nature there are trees and other things; there is no such thing as a negative tree, a non-tree. It is a human being who, using language, indicates that in a certain space there is “not” a tree and that, for example, it would be good to have one, so the human decides to plant one. Somehow, the creation of negation duplicated the reality in language. It generated potentiality and multiplied the human capacity to create the nonexistent.

Communication also became more varied because negation can be used to reject an offer and communicate this rejection. As communication variations increased, more alternatives became available for selection, and a few such variations were maintained during societal evolution, re-stabilizing them. The evolution of society was doing its task. Articulated language, therefore, marks the beginning of humanity; thereafter, nothing was the same. Once human beings have language, everything is in that language: we exist in our own language and we conserve our adaptation in the domain of meanings that this creates ([25]: 139). The human being is a talking being ([13]: 165). Since the beginning of mankind, communication has, therefore, been the constitutional base of society.

The evolution of human society hastened its rhythm. Negation multiplied the possibilities and made it possible to dream of potential realities. What did not exist in reality could be imagined and communicated to find, with others, how to make it real. For each discovery, negation generated options (e.g., “we should not do it that way, but this way instead”). In this manner it encouraged the capacity of innovation, bearing fruit such as the domestication of animals and plants, the wheel, the use of metals, etc. [14].

Over thousands of years, humanity continued with its process of populating the globe. Knowledge accumulated slowly, because oral traditions did not fully conserve a generation’s know how. A big part of this was lost when the ones who experienced it passed away. There was also little knowledge exchange amongst different peoples. The distance would create a barrier difficult to cross. Human settlement sizes increased, and nomadic tribes razed their territories. However, there is no sense in speaking of conquests because it was nearly impossible to maintain extensive territories under the same reign.

Five or six thousand years ago, a new communicative achievement announced a leap in evolution: the technique of writing [15]. Like many big inventions, writing was not designed for its later use; the objective sought upon its creation was not communication because no one knew how to read. In different places it had its various reasons. In ancient Egypt, writing had a religious purpose: to praise gods, present them with deceased souls and make them propitious. Gods knew how to read, because writing came from them.

In China, writing was represented by the drawings that could be found in bones and turtle shells after being thrown in the fire, in the art of prediction. It was estimated that it was faster and easier to represent in dice and coins the signs that would appear when, under the influence of fire, the outer layer of bones and shells would crack. These dice and coins would be simply thrown or chosen at chance and with these the Chinese would predict their destiny. In China’s case, Luhmann said, people knew how to read before writing because they used to copy the signs from bones and shells that would have a previously defined predictive meaning ([20]: 202). In general, as demonstrated in these two cases, writing typically had a secret quality that only a select few understood; it was used not to communicate, but to conceal. It was not used for passing knowledge, but for preserving it. It was used not to share knowledge, but to hide it. It was meant not to reveal, but to encrypt.

Much time passed before the communication utility of writing was discovered. Egyptians slowly realized not only that gods could decipher their messages, also that in posterity the messages could be deciphered, because writing lasts longer than human lives. The inscriptions in tombs started to be addressed to the people of the future, telling of the lives, achievements and virtues of their occupants. If writing would transcend time, it could also overcome the difficulties of space. Regardless, it was useful to simplify it, for it to be easier to learn in broader segments of the population. In Egypt, the hieroglyphics extended to five levels of complexity, with the most basic one being for commercial purposes. The phonetic alphabet came later; it was derived from Phoenician syllabic writing and it seems to have been motivated by communication needs that arose from the development of commercial relationships in the eighth and ninth centuries B.C. ([20]: 203).

Thirty or thirty-five thousand years were strictly necessary for this advance in communication. Its effects were unpredictable and it involved the change of the human being’s lifestyle. If language had permitted communication to become abstracted from the specific

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