EFFECTS OF THE (ELETRONIC) MEDIA ON COGNITIVE PROCESSES

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Abstract

Authors of this paper argue that the process of recognition is not a simple correspondence between recognising subject and recognised object. According to them, language plays an important role in a process of recognition. Language as a system of signs signifies sensory perceptions otherwise viewed as a mixture of closely unidentified notions. It mediates and creates reality in a certain way. As well as being a system of signs, language is a communication medium. Similarly, but in a broader sense, media, such as print and electronic media, constitute also a semiotic and communication system. Every medium, by its nature (technological structure) has a different effect on man's recognition, for example, print strengthens a distance, visual imagination and abstract recognition. Electronic media strengthen hypertext and rhizomatic way of recognition with its own possibilities and risks. Possibilities may be represented by rapid gathering and hypertext interlinking of information, risks are represented by creating of a virtual, superficial and incoherent recognition.

Keywords: cognitive processes, speech, writing, print, electronic media

1. Introduction

In the history of European cogitation there was a belief for a long time based on the idea that our recognition corresponds to recognized things. Father of this theory, Aristotle, developed a two-stage theory of recognition that begins with sensory perception and ends with valid cognition of sensory impressions. Recognition, according to Aristotle, was a valid recognition of forms of things. Form, which substantially determined the matter, was also recognized in the mind. The correspondence theory was very influential, because it corresponded to large extent with pragmatic orientation of man in the world. This unproblematic recognition approach was questioned by Immanuel Kant, who argued that it is subject of man who actively takes part in recognition of the world. According to Kant, sensory perceptions are shaped by aesthetic cognitive

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forms of time and space and categorical apparatus of reason which he still understood as a universally given. Kant did not consider these "forms" (categories) to be connected to language in any way. The language turnover occurred in the second half of the 20th century, especially in relation to the work of L. Wittgenstein and his second period of creation. In his epistemology recognition is constructed on the basis of language that is culturally and socially conditioned. This means that it isn't a 'mirror' of the world, as believed by correspondence theory of recognition, but it has a consensual nature. H.G. Gadamer [1] also states that *"all understanding is interpretation. Each interpretation is developed through language that allows the object to take the form of words".* Current philosophy generally accepts the fact that language plays an essential role in our recognition. Language is also a medium of communication, like other media, such as fount, press and the Internet. The question is whether these media play the similar role in regard to recognition as language does and, if so, what type of recognition do they support and what don't? Based on this recognition it will be possible to identify the possibilities and risks, particularly of recognition mediated by electronic media. Before that it is necessary to clarify the cognitive processes, in general.

2. Cognitive processes in general

The term 'cognition' or human cognitive processes is used more often in the current discussions on human cognition. R.A. Slavkovský [2] claims that the use of the term 'cognition' preferred by the cognitive sciences emphasizes a more comprehensive and more technical approach to recognition. Cognition, in his opinion, is the process by which knowledge and understanding are developed in our mind. The term 'cognition' is more appropriate for us also because it is more associated with information processed by computers, artificial intelligence and it is connected more with electronic media.

Fundamental cognitive processes can be regarded as perception and recognition. We can explain the process of perception using an example of the phenomenon of vision. First, a light incident on our eye is refracted in the lens while stimulating the nerve endings in the retina of the eye. This first phase can be studied by Physics. The second phase begins with stimulation of the retina and transmission of nerve impulses to backside of the brain. This phase may be examined by physiology of vision. However, neither Physics, nor Physiology can explain the very fact of seeing [3]. Vision cannot be examined without the subject of perception itself that is able to see. The phenomenon of vision has three levels that participate in a perception: it is a physical level, the physiological and mental (conscious) one. But how is the observed shape itself constituted? What is the role physiology and consciousness?

It seems that between the consciousness of vision of shape and physiological or sensorimotor activity there is a memory that plays an important role, having a deep, unconscious dimension and activating the appropriate shapes for the perception. This process is accompanied by consciousness which

provides a semantic awareness of shapes. This means that without the memory there would be neither any shapes available, nor the whole network of shapes during the process of thinking consequently, and without consciousness we wouldn't recognize these shapes as shapes. Perception originates from interaction between the neuronal activity and consciousness, in which a memory plays an important role. For example, if we can see something lying on a sidewalk which is thin and wavy our memory creates a vision of a serpent. If we approach the thing we may convince ourselves it was mistake, because it was just a twig on the sidewalk. Formation of our ideas, as implied by the Gestalt psychology, is affected by memory or basic shapes.

From a philosophical perspective, it is still important to distinguish between neuronal activity and memory. Neuronal activity itself cannot create a perfect idea or a concept, but it may indicate it. H. Bergson [4] identifies it as a 'movement' or more precisely 'kinetic creation of frames', into which a specific state of soul such as idea, memory i.e. is placed. Bergson expresses the belief that 'frames' are quite vague and may not be filled only with identical, but also different contents. According to Bergson, but also classical approaches in philosophy, the perfect vision cannot be 'shaped' in the physiology of the nervous system, because it has a higher quality on a level of consciousness and memory. For example, electric flashes on the backside of the brain, observable during recording, cannot give us a full picture, but only quantifying moving sketch, which can be qualitatively co-created only with participation of consciousness or memory.

The process of recognition is complementary to the process of perception. If we can see something, we recognize that simultaneously. For example, seeing 'trees and flowers' is also the language designation of 'trees and flowers'. Similarly K. Mišíková [5] argues that "perception is a mental construction, built by information from sensory organs and their comparison with the hypotheses stemming from cognitive schemes in our mind". Designation of sensory perception is also a specific recollection, because each perception is connected to a certain design or shape we have in mind. Shapes in mind are also linguistic units, because everything designated belongs to our language. Memory which plays a crucial role in perception and recognition belongs to the realm of language subjected to linguistic or semiotic rules.

Linguistics and semiotics in the process of learning emphasizes particular aspect of the relationship between the signs. Meaning according to these approaches generates a network of signs in various positions and oppositions. Meaning has no substance-like character, but is formed by the interactions between the signs, by the comparisons and mutual semantic deductions. The differences between the signs which are in certain compositions also give them different meanings. U. Eco [6] says: "A cultural unit (meaning – S.G.) can't be isolated only by its sequel of interpretants. It's defined in a way that it is put in the system of other cultural units that are its opposites and it is bounded by them. Cultural unit 'exists' and is recognized due to the fact that there is another unit that is in opposition to it. It can be defined as a relationship between the various

members of cultural units, which subtract what is transmitted by others." U. Eco [6, p. 105-107] even states that "according to this method it would theoretically be possible to design a robot that would own stock of semantic fields and rules how to link them with the system of sign tools". Based on Eco's approach the semiotic and linguistic rules as well can be considered to be general rules of our cogitation and, consequently, the basis of our recognition.

However, our recognition can be affected by the actual media technology and the form of communication is determined by them. For example, one meaning influenced by speech has absolutely a different impact, than when it is influenced by other medium, like writing. Articulate speech, perceived by hearing, supports wholeness and depth of communication. On the other hand, signs perceived by visual reception boost up the logical and abstract thinking. Imagination and recognition are formed by the nature of 'reading' of certain communication media as a certain type of thinking. For this reason, it will be necessary to study the traditional media such as speech, writing, print, their essence and impact on human cognitive processes. Knowledge of these media should help us to facilitate the recognition of current electronic media and their impact on human cognitive processes.

3. Speech, writing and print in the context of human cognitive processes

Speech in terms of spoken language is a primary and privileged medium of communication. Through the speech we think, express, communicate and recognize. Speech is adherent to our being. It is therefore considered to be the 'mother' of all media. Spoken language is often subsumed in the hermeneutical and linguistic approaches under the general name, which is a language, into which the other media, such as writing, step in.

Therefore, we should distinguish between speech and language, or between narrower and broader understanding of speech. This difference is also important in terms of understanding the development of human communication, which has been reflection of a speech for a long time, then 'contaminated' by writing, print and, at last, the electronic media. Speech remained being a speech even after the new media appeared, but we have to assume that every new medium has changed the internal structure of speech in a way of presentation, cogitation and recognition. It is important, for this reason, to examine each media from a phenomenological point of view, especially their technological structure, which had a decisive influence on changes in the collective mentality or culture of every period.

Speech is the first and inherent human communication medium. Articulate words are formed in the vocal folds and spread the sound waves through space. This audio 'scene' of phonemes is important for understanding the nature of speech and the fact, what type of knowledge will be supported by it. Producing of phonemes leads to their mutual intersection. One is not even finished and the other one is about to be heard. Together they form a sort of 'melody', which draws the communicators inside a communication space and time. In terms of

the semiotic rules in speech there are less sharp and unstable distinctions between the signs, e.g. phonemes. This perspective shows that this type of communication is more likely to encourage holistic understanding which will be transferred into the culture and society. Current research concerning tribal societies without the knowledge of writing confirms the fact that their picture of the world is determined by the structure of their speech.

Their understanding of time is cyclically closed. Unless there is a past, there is neither chronological nor spatial rupture between the world of the dead and the living. Spirits of the dead are still somehow present among the living and can help them but also do harm. Space or the world of tribal society is divided into upper, where the gods and dead souls live, and bottom which is the underworld with evil creatures and the medium one where man lives, however, these dimensions are interrelated. Picture of the world is determined by the possibilities of language which provides terms relatable to nature and their physical needs. Usually a few abstract words or expressions that indicate feelings of man are occurring.

Organization of society in the era of speaking is in a reciprocal relationship with the medium of speech and collective mentality. For this reason, even the organization of society is collective and holistic [7]. During this period, individual consciousness which would be independent from the community, with individual thought and action doesn't exist. The individual and his consciousness are still deeply immersed into the collective and mythological ideas.

Writing breaks this wholeness. It's given by the technological structure of letter itself, particularly phonetic which is a linear succession of visual signs. Reading and writing signs brought a prospective vision, discipline of thought by accurate distinguishing of meaning, greater distance from things and thus abstract thinking. M. McLuhan uses several impressive examples demonstrating the difference between cognition and imagination in the speech era and writing era. For example, in his work, the *Gutenberg Galaxy*, he gives an example of a hygienist who wanted to teach the Natives in Africa about hygiene by showing a film. Quite long and slow film showed the natives how to handle water, garbage, etc. At the end of the projection he asked natives what had they seen saw in the movie, and they all consistently replied - hen. But the chicken has only accidentally glimpsed in the film.

McLuhan [8] concludes that Native vision wasn't prospective but fragmentary, without the distance and rather tactile. He says: "Literacy gives people the opportunity to focus at a short distance in front of the image, and so overlook the whole image at once. Illiterate people do not have such a habit and cannot look at the objects like us. They rather overlook objects and images as we overlook the printed page, a part after the part. Their view doesn't have a distance. They are connected with the object. They empathise with it and don't use the eye prospectively but tactilely. They are unaware of Euclidean space dependent on separation of vision from touch and hearing."

McLuhan [9] demonstrated on several examples that the concepts of time and space are conditioned by the media. One example speaks about Nigerian students at American University where they are sometimes asked to identify spatial relationships. Nigerian students who come from tribal communities in Africa, based mainly on a spoken communication, often fail to show in which direction to the sun the shadow will turn out, because they cannot imagine the three-dimensional perspective. The Sun, subject and observer are considered to be separated and independent in their eyes. Another example by McLuhan [9] is offered from the area of Melanesia: "In an anthropological film we could see a Melanesian carver carving a decorative drum with such a skill, coordination of movement and easily that his audience applauded several times - his work had become a song, a ballet. However, when anthropologist asked the Natives to produce boxes in which these carvings would be transported, they could not even construct two boards at right angles during three days. Finally they gave up in disgust. They couldn't wrap their own creation." Natives obviously could not imagine an abstract three-dimensional space or space in space in a shape of a drum inside a square, cubic crate. Natives always perceived space as a unique area of a particular thing. However, this does not mean that the natives were at a lower cultural level [10]. They are just not developed certain cognitive skills connected with a new external media.

Based on their technological structure, writing and printing encouraged humans to take distance from things, to develop prospective vision, abstractness, and cognitive discipline. These factors had an impact on the collective thinking in a culture but also on the organization of society. In the collective mentality of the writing era was undermined the holistic and cyclical notion of time which is replaced by the idea of a linear time. Archiving of written texts supported the idea of the past separated from the presence and, on the other hand, created an opposition to the future that has not started yet, but we may expect and anticipate. Apart from constituting the linear sequence of ideas, writing also contributed to discipline thinking. If we want to write something down it must be written logically, syntactically and grammatically correct. While speaking we may make digressions, add meanings, use parenthesis, use mimic and gestures, which cannot be applied in writing. This means the writing through orderliness encouraged the birth of scientific thoughts.

Writing, by its mediated nature of communication, created an inequality in communication. Through the writing, communication distance supported the authority, the creation of power and thus changed the organization of the society from a global to hierarchical. Letters, based on their reading and writing, strengthened the position of man as an individual subject. In the writing era, e.g. in the Middle Ages, the subject of man has not completely emancipated from the society because the it was still ruled by individuals. It has not been changed until the modern times when the subject of man has become fully autonomous.

Hand in hand, the era of manuscripts was continually followed by print but on the other hand also significantly transformed by it. Unlike manuscripts, the principle of print was based on a new technology of producing font that have

been standardized and separated from the author. Another part of this principle was a rapid production of large quantities of identical printed copies which affected the homogenization of culture and then creation of mass society. McLuhan [9, p. 185] already realized this by arguing that the "typographic extension of man brought nationalism, industrialism, mass markets, universal literacy and education".

Within epistemology, the print had a significant impact on the subject - object idea of recognition. Similar to the production and dissemination of the print out the author's grasp, recognition that claims to be objective, must be independent of the subject. Objective recognition (knowledge) was seen as mechanistic and mathematically calculable. This approach has been also strengthened by the discovery of the watch, which externalised and mechanized time. Time became mechanical, as well as linear. It is no coincidence that at this time the Dutch jurist Hugo Grotius came up with the notion that "accuracy is a virtue" [11]. French King Louis XIV already had an exact timing of activity protocol from dawn to dusk. If there was no printing press and watches such protocol would not be possible.

Printed copies, including reformist ones or Bible in native language, promote individualism and subjectivism. A person who reads a book or a newspaper leads a 'dialogue' with himself or herself. One compares and confronts the read thoughts with himself/herself, his/her own knowledge and experience. This process will deepen and strengthen the mental structure of a man, i.e. the subject of man. In modern times, the subject of man is developed, autonomous and to some extent independent from the society. On the other hand, homogenous views under the influence of the press are originated we refer to as public opinion. Public opinion was active in cities and J. Necker says on the eve of the French Revolution: "It's an invisible force without any gifts, troops or army that gives laws to the city, court and extends itself up to the Royal Palace" [7, p. 111]. Public opinion gradually paved the way for forming of a mass person who, in the true sense of the word, appeared in the 19th century, when formation of a mass culture and a mass person had begun.

In modern times, organization of the society has also been changing. The society is no longer perceived as the categorically given whole, superior to the individual, but as a whole, which is produced from the 'bottom' by individuals. The individual in modern times has been so strong and emancipated philosophers of society (T. Hobbes, J. Locke, J.-J. Rousseau) had seen a potential, specifically for creating contractual relationships with other individuals and delegating their own powers in favour of the whole group.

Based on these changes we can assume that similar changes in perception, cognition and recognizing, and subsequently throughout the collective mentality and organization of the society will also take place even under the influence of contemporary electronic media.

4. Influence of the electronic media (the Internet) on cognitive processes

In the second half of the 20th century, Western culture and society were dramatically changed especially under the influence of scientific and technological revolution, during which a very important role was played by information technology [12]. Miniaturization, the increasing speed of digitalization and networking are typical for new information technologies. Miniaturization developed into ultra microscopic levels and velocity approached the speed of light. Digitalisation was expressed in the transfer of all semiotic signs to numeric code 0 and 1. The networking experienced an enormous boom in the advent of the Internet in the early '90s.

The Internet, according to J. Lohisse [7, p. 167], is a medium of the information era, which has nothing to do with mass media like radio or TV. T. H. Eriksen [11, p. 17] says the Internet is a unique medium and its inception in early 90s is considered to be the start of the 21st century. The Internet is a medium in which a subject can actively enter and interact with.

Language of this media is techno-digital and if man is willing to communicate by it he has to adapt it, for example by writing e-mails, blogs, chats, etc... There is not a lot of time and space to properly express thought. Therefore, the texts often tend to get shorter and without an emphasis on grammatically correct writing. In addition to technical language, the human cogitation must be adapted to new hypertext search capabilities and merging of information. The current state of the Internet already includes a variety of media, which combine text, image or sound. Surfing the Internet enables the combination of logically irreconcilable content such as scientific texts with entertaining ones, image content, i.e. thus creating a pluriverse of information. Users select the content according to their wishes and desires while communicating online and thus create their own rhizome of recognition (the term 'rhizome' is borrowed from Botany and denotes branched and interconnected root system. Rhizome as a metaphor of eccentric thinking and recognition has been first used by G. Deleuze and F. Guattari). J. Šušol [13] argues that "the rhizome as a set of interrelated information points is within each individual cognitive process as individual as an individual person who is in contact with it". Recognizing of a person is under the strong influence of the subjective approach towards searching and integration of different information.

Communication via the Internet takes place in the technological space called cyberspace. It is a visual-auditory space in which three-dimensional physical coordinates do not exist. It is a communication space characterized by fluidity and plasticity. Inside, we can observe 'online' real things as well as virtual. In no other medium, the problem of virtual reality is as visible as here. In cyberspace, we can live another, for example, virtual life, the results of which we can transfer into a real life, whether psychologically in identifying with some character (avatar), or objectively by transfer of virtual money called Bitcoins to Euros.

Communication in cyberspace does not occur in a linear, progressive time but rather discontinuous and coexistent. It is a given by the fact that cyberspace does not have a fixed the beginning or end of communication, such as a sheet, book or newspaper has. Communication in cyberspace is open to other forms of communication and we can constantly change or update it. Computation of time does not have focal points in regards to the succession of information because it is constantly starting over again, like in simultaneous chess game where a chess master has to constantly return to kicked-in 'beginning' of other games. Similarly, says P. Rankov [14] that "in the net, only culture spreads horizontally, simultaneously, purely dimensionally and the term of time loses its meaning".

Time-space categories are the basic existential coordinates of human and our cognitive processes, as Kant pointed out, represent the first contact and primary processing of perceived reality. If these coordinates are changing, we expect our perception and recognition to be changed as well. Communication in cyberspace cancelled the original perception of space as a large, dangerous and unknown, and also replaced the game the linear computation of time. In the first case, our existential space becomes too small, transparent and virtualised, in the second case we view the current time as current and hypertext-like.

Internet as a crucial electronic media of today has an impact not only on the structure of cognition and recognition, creation of space-time conceptions, but also the organization of society called cellular by J. Lohisse [7, p. 179]. The cellular society means a physically isolated human being who communicates, works, does shopping and even is entertained by cyberspace [15]. These communication cells, as we can see today, for example, on the Facebook, may include themselves into larger units interconnected with certain values and ideas. Even this way is possible to evoke a mass phenomenon similar to the print era. In this case it would be the same dialectic of the individual and collective. On the one hand, the individual himself actively chooses his rhizome of recognition, on the other hand is 'dissolved' in the collective consciousness of the social network.

The picture of the world created under the influence of the Internet becomes current and virtualised kaleidoscope of changing information generated by the humans themselves, but on the other hand taken from the collective and mass opinions and beliefs. Shaped recognition like this has its own positives and negatives.

1. Positive side could consists of the possibility of rapid information retrieval ranging from atomic to complex units, from the signs to the audiovisual information, which is related to the possibility of exploiting the immense reservoir of information scattered in cyberspace of electronic media. This 'reservoir' is called 'collective intelligence'. Its indisputable advantage over recognition in the past considered as time consuming, etc.

2. Risks could include 'flipping' over the rhizome recognition in purely subjective-virtual version out of the social and consensual recognition to chaotic-hypertext linking of information without the continuous and logical cogitation. A certain risk could also be made by changed notions of time

and space under the influence of which an underestimation of the importance of the past [16] or real space could get fatal. In the context of communication by social networks, this might mean the uncritical acceptance of mass opinion.

Based on the knowledge of a positive or negative impact of (electronic) media in human cognitive processes it is important to learn a critical reciprocity [17]. Existential detachment is needed for the critical approach that would form the framework for the mental distance. Such a distance could be achieved by a certain counter-action such as targeted search for solitude where a person would be at least for a while just with himself/herself outside of a deafening and seductive influence of media.

5. Conclusions

In this work, we firstly examined the cognitive processes (perception and recognition) in general and the impact of the media on human cognition. We concluded that the media have a major impact on our perception and recognition in particular. This conclusion is supported by the vast majority of contemporary philosophers. For example, W. Welsch [18], the representative of post-modern philosophy, similarly argues that there is no independent recognition of the media reality. Our recognition of reality is already mediated by the media and it essentially has a constructivist nature. Tökölyová T. and T. Modrzejewski [19] argue that all media in some way interfere with our thought, imagination, and generally engender the understanding of the world.

Particular attention was devoted to examine the impact of various media on human cognitive processes with a wider impact on the collective mentality (notions of time and space) and the organization of society. We examined four media which, according to the authors, such as J. Lohisse or S. Harnad, had a revolutionary impact on the development of Western culture: speech, writing, print and electronic media (the Internet).

Speech, based on its acoustic broadening supports through recognition a wholeness and depth. Phonemes in communication are in fact intertwined by each other and create one 'musical melody'. Meanings generated between phonemes are not isolated and separated from other meanings, but interconnected. This type of cogitation creates wholeness-like ideas about cyclical time, life, as in the space all dimensions are connected including even the sacred ones. The organization of such a society is global and the individual is aware of the collective.

Writing, particularly phonetic, based on a visual character of linearly signs, fixes and distinguishes arranged signs that support a disciplined and continuous development of ideas. Visual signs further support the prospective vision, distance and abstraction. Recognition, under the influence of writing, leads to accuracy and distinction in time or space. Time gradually came to be perceived as linear with the fact that, for example, the past is already gone forever and the future is not here yet. Space is differentiated under the influence

of writing into the sacred and the profane. Social organization begins to be hierarchized because font supports power and authority and individual consciousness as well.

Press as 'typewritten font' deepened and widened much more tendencies that were raised by writing. Print supported subject-object cogitation, abstract rationality, linear time and individual consciousness. Individual consciousness has been so strong in the social organization that the social theories were derived from the agreement of individuals. The sharing of the same ideas spread by the press brought the phenomenon of massification.

Electronic media, especially Internet communication supports image, hypertext and discontinuous thinking. The result is so called rhizome recognition that brings together different information each person creates himself. The new media have brought radical new ideas about time, space and reality. Linear time in the Internet communication is deleted and becomes current, space evolves into cyberspace and reality gets virtualized. Inside the social organization a celularization of society occurs. The communicating individual is physically separated but connected with the world by information technologies, which may, as opposed to individual rhizomeric recognition paradoxically lead back to mass cogitation and recognition.

Communication and recognition through electronic media, particularly the Internet, has its positive and negative traits as well. The positive traits can be classified into speed and availability of communication, drawing from the collective intelligence and the negative: risk of subjective-virtual access to recognition weakened by lack of concentrated and linear thinking. For this reason, it is necessary to constantly practice a distance and critical reciprocity of the media, which could be supported by the search of solitude for the purpose of being oneself.

Acknowledgment

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