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ARCHAEOLOGY OF COGNITIVE SCIENCE: MICHEL FOUCAULT'S MODEL OF THE COGNITIVE REVOLUTION

1. INTRODUCTION

Cognitive science has a distinct place among social sciences and the humanities due to the breadth of research topic and the multitude of methods as well as the controversies of the theories and hypotheses formed therein. Broad historical parallels are symptomatic. Its main topic, which are the peculiarities of the human mind and cognition, is undertaken trough reference to modern concepts of the mind-body problem. The existence of *philosophical* linguistic-categorical analyses in cognitive science as well as experimental and laboratory methods of cognitive psychology, which coexist with neuroimaging methods as well as with computer simulation and modelling, grants it its distinct character. If one adds on to, as many historians say, its "short history, but deep-rooted past," the presence of several dominating and simultaneously competing positions or research perspectives, or even worldviews, we are dealing with a scientific discipline with a special position. This position is additionally strengthened by an array of practical applications: from the characteristics and the diagnostics of mental phenomena — including its aberrations — through therapy, up until the construction of appliances supporting or substituting human thinking. Cognitive science is a scientific discipline, which stands out among the social and humanistic sciences for each of the abovementioned reasons.

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After a period of early transformations—when it *cognitive science* began forming as a separate scientific discipline from a coalition of six specific disciplines, starting off as “cognitive studies” then “cognitive sciences” and ultimately as “cognitive science” — it began to indicate interesting methodological and epistemological properties. From a more than half-century perspective one can currently see that cognitive science has passed, or is indeed passing through, several stages of the development of a paradigmatic science typical for a mature discipline, including revolutionary and counter-revolutionary periods as well as newly emerging challenges before it. This allows one to notice already numerous historical and methodological elaborations on the topic (this article refers to four of them). For an in-depth analysis of cognitive science I refer to the epistemological-synchronistic method, which Michel Foucault (FOUCAULT 2012) used in the reconstruction of modern humanistic disciplines. His “archaeology of knowledge” is a model reconstructing the emergence of a scientific discipline from various types of experiences, which is carried out with the participation of discursive practices and social institutions creating scientific knowledge. The Foucauldian model shows in what way particular inquiries emerge in various fields as well as issues and terminology referring to new problems, which after transiting from one stage to another (or thresholds, as he calls them), deliver a new form of knowledge, or speaking more precisely, the *episteme* that dominate a given science. The French philosopher’s epistemological and historical inquiries as well as the model of a scientific discipline elaborated by him facilitates the recognition of the specifics of cognitive science at a stage, on which it has already found itself, and also shows the directions of its further development and the challenges which appear ahead of it.

2. THE REVOLUTIONARY AND COUNTER-REVOLUTIONARY NATURE OF COGNITIVE SCIENCE

When George A. Miller (MILLER 2003) at the beginning of the 21st century analyzed the emergence and development of cognitive science, he had no doubt that we are dealing with a new scientific discipline, which is radical in its theoretical assumptions and methods. Observing the distinct nature of cognitive science amid the radical change of the research perspective in the previously-formulated sciences focused on human beings, he called the change that it invoked in twentieth century science — the “cognitive revolution" (MILLER 2003, 141). The revolutionary nature of cognitive science is two-fold: for one, it is simply a revolution, but — as Miller noticed — a counter-revolution, because it is a radical change compared to the preceding revolution, which was invoked by behaviorism in contemporary psychology, in relation to nineteenth century experimental psychology, which — in turn — was derived from the philosophically-oriented classical psychology. Compared to behaviorism, which discarded the category of the psyche (mind) and limited psychological research exclusively to behavior, the return to the study of the mind, along with the preservation of its empirical nature, but most of all acknowledgment the autonomy and the abundance of mental phenomena, was indeed counter-revolutionary. Western psychology thanks to the new science transposed the issues of mental phenomena to a new theoretical-methodological level, liberating them from behavioristic assumptions and supporting them with empirical-formal methods of research. "Whatever we called it, the cognitive counter-revolution in psychology brought the mind back into experimental psychology" (MILLER 2003, 142). The revolutionary nature of cognitive science expresses itself not only in the multitude of research methods and in the diversity of cognitive perspectives, but also through its practical character. It involves introducing many technical, engineering, industrial and institutional solutions, tools, strategies, and modes of conducting research to the mind sciences as well as to their broad extra-scientific applications. This means that cognitive science is not only an academic discipline, but due to its entanglement in the post-war transformations of the post-industrial society, it is also a part of the technological civilization.

Miller, being one of the founding fathers of the new discipline, links its emergence to many researchers and theoreticians from numerous sciences (from psychology through linguistics to computer science), which include among others Norbert Wiener, Marvin Minsky, John McCarthy, Alan Newell, Herbert Simona, Noam Chomsky, and Jerome S. Bruner. Throughout the fifties and sixties of the last century (especially in 1956 — during two seminars at Dartmouth College and MIT), all of them participated in the elaboration of the new paradigm. Their research and the results were supported by numerous institutions and research programs, especially the Sloan Foundation, illustrating that the revolutionary character was, from the beginning, a consequence not only of radical transformations in science itself, but also of innovative changes within societies after World War II, wherein research on mental phenomena and cognition received support from public as well as private centers and thus were applied in technological endeavors.

A *multidisciplinary* field of science, cognitive science — from the very beginning — initially by simple addition or acquisition, included various disciplines from the fields of the humanities, and social and technical sciences. Miller indicates six basic disciplines; among them he mentions three central ones — psychology, linguistics and computer science — and the other three — philosophy, neuroscience and anthropology — as peripheral. He indicates that the criterion for discerning them is to a greater extent *institutional* rather than thematic: "These fields represented, and still represent, an institutionally convenient but intellectually awkward division" (MILLER 2003, 143). This division is still recalled and is present in all of the analyses concerning cognitive science. Apart from that, Miller states that the development of the new discipline has shown that the combination of six different subdisciplines with each other (which is able to be presented in hexagonal model) constitutes the permanently-interdisciplinary character of the new discipline; interdisciplinary, or indeed multidisciplinary, has come about as a result of the compilation and partial integration of various disciplines. He also notices that despite the multitude of various perspectives and methods, cognitive science has (most clearly in its beginnings) a rather *homogenous*, unifying character, which simultaneously is the expression of the old (modernistic) concept of a unified study of the mind and its place in the natural world; it is constantly present in it, despite the fact that the model postulating the unity of science (especially in its neo-positivist version) has already become outdated. "For myself, I prefer to speak of the cognitive sciences, in the plural. But the original dream of a unified science that would discover the representational and computational capacities of the human mind and their structural and functional realization in the human brain still has an appeal that I cannot resist" (MILLER 2003, 144).

Howard Gardner, in his monograph *The Mind's New Science: A History of Cognitive Revolution* (= GARDNER 1985), also draws attention to the revolutionary and breakthrough character of cognitive science. Presenting a wide range of issues and problems which constitute the discussed discipline, the author states that many of them reach back to ancient times, although mainly to modern ones, which, nowadays, have adopted the form of philosophy of mind. "One might say that cognitive science has a very long past but relatively short history" (GARDNER 1985, 9). These problems are typically *epistemological* issues — referring to the nature of human knowledge and cognition, and its structure and development as well as to the specifics of mental phenomena, predominantly their representational character. Due to the introduction of methods of simulation and modelling, which refer — to computer science — primarily theories that emerged from the discussions on the Turing machine — cognitivist concepts concerning what is cognition and knowledge taken on the form of a refined homogenous discipline with computationalism as the dominating current of research. Gardner characterizes its specifics by enumerating five "symptoms" present in all of its variations, which cognitive science has adopted within the many decades of its development; some of them have the nature of dilemmas and open questions posed by cognitive scientists as well as by philosophers connected with the discipline. In the research on the mind, the first one is considered to be an indication of the "level of representation," which is characterized with the aid of symbols, rules, and images distinguished between entering and exiting the system, which consist of the mind and body. Representations and the processing of them are brought and reduced to the level of the nervous system (which provokes controversies in the discipline) and used to explain the diversity and functioning of human behavior, action and thinking. In other words, the "cognitive scientist rests his discipline on the assumption that, for scientific purposes, human cognitive activity must be described in terms of symbols, schemas, images, ideas, and other forms of mental representation" (GARDNER 1985, 39). The second symptom of practical (technological) significance is the use of computers and programs therein to describe, depict, model, and simulate human cognitive activities and processes of the neural system. Its effect, already on a theoretical level, is the identification of the human mind with computer software; in this case, the methodological tool decides the shape of the theory of mind and cognition. The third property assumes the form of an argument regarding whether to include (or omit), in the examination of cognition and the mind, such factors as affects, cognitive contents (and not only the formal side of the representation), context, or the time of formulating cognitive representations; this dilemma is constantly disputed and investigated anew. The fourth, most significant, symptom is *interdisciplinarity*, which is considered to be an asset of cognitive science. The fifth one is the constant reaching for the philosophical tradition, which sets the directions of scientific research.

All of the symptoms, as Gardner notices, indicate that although one has to deal with a homogenous and yet diverse research as well as with the theoretical field, the discipline's universal character, assumed and postulated by many scholars and researchers, is — nonetheless — debatable. The old methodological dilemma is adequate for cognitive science: unity through diversity or unity despite diversity? "Why there may eventually be a single cognitive science all agree that it remains far off. Investigators drawn from a given discipline place their faith in productive interaction with practitioners from other disciplines […]. At most, there should be cooperation among disciplines — and never total fusion" (GARDNER 1985, 42). The methodological status of cognitive science is, from the beginning, a subject of discussion and divergent opinions.

Undoubtedly, there has been a significant and unprecedented integration of research problems and tasks into an interdisciplinary theoretical and practical field with a clearly empirical and practical nature. This actual state, and simultaneously, postulated vision of universality accompanied cognitive science from its beginning and during its development. Its specifics, besides its revolutionary characters, which Gardner sees in the distinct *paradoxicality*, are invoked by the main idea of this discipline — that is computationalism. The belief, of old philosophical provenance, in the possibility of creating a counting machine equal to the human genius, revived and strengthened by results coming from computer science — modeling and even simulating mental phenomena — introduces to science the intellectual ferment and constitutes both a theoretical and practical task. This paradox is, at the same time, a challenge, which creates the necessity of working out new tools and theories: "Even as cognitive science has spawned a paradox, it has also encountered a challenge. […] It is important for cognitive science to establish its own autonomy and to demonstrate terrains in which computational and representational approaches are valid" (GARDNER 1985, 44). This challenge is inferred not only from the possibility of the broad application of computational models, but also from the indication that not all cognitive processes and mechanisms have a computational nature. Indeed, cognitive science would not have emerged if not for the micro-computer revolution, but its main ideas grew out of the long tradition of rationalism in Western philosophy and the belief in the *rational* — logically sound, coherent, unchangeable, and effective — thinking and acting of the human being. Not all ideas constituting cognitive science are consistent, there are many currents and perspectives of new thinking about the human mind and cognition in it. As Gardner points out, the idea of representationalism can manage without the computationalist assumption in particular fields of research, especially those referring to unconventional and intuitive activities: "Representation without computation is one possible outcome for certain regions of cognitive science. […] It is already clear that one kind of computer does not suffice to model all thought. We must face the alternative that humans may be an amalgam of several kinds of computers, or computer models, or may deviate from any kind of computer yet described" (Gardner 1985, 386–387). Not only are computer analogies important or exclusive, but also the explanations, which refer to the biological and social nature of human cognition, thinking, and knowledge. Gardner notices (following Hillary Putnam's suggestion) that the role of computers as tools and models can neither be depreciated nor overestimated. Their double function as tools used for: (1) *measuring* and examining mental and neurological phenomena as well as (2) *simulating* and recreating these phenomena in technological environments, robots, etc. must clearly be discerned and one must not mistake one with the other. The mutual correlations between human thinking and computer tools must be apprehended in appropriate relations and proportions, without exaggerated expectations as far as the particular cognitive or even creative capabilities of artificial intelligence go: "[T]he community surrounding a cognizing individual is critical. From those around us, we come to understand which sorts of views are considered acceptable, which are false or dangerous, justified or unjustified. Such judgments cannot initially be made by an individual but must stem from collectivity […]. The computer is simply executing what has been programmed to execute, and standards of rigid and wrong do not enter into its performance. Only those entities that exist within, interact with, and are considered part of a community can be so judged" (Gardner 1985, 388). The revolutionary character of cognitive science is not a result of the computer revolution as such, but of the radically different perspective, which computers initiated in the process of cognizing the mind. One should expect it in the change of the rules of acting and thinking (including self-reflection and self-control) within the communities of its creators and users. Not the computer itself (its digital construction and algorithmic principle of functioning), but its use and the imagining of its use play the main role in this change. In this very sense cognitive science reveals the paradoxicality of the scientific discipline, which through acquiring diverse contents and ideas from various sources, creates a perspective that is divergent and ambiguous from a methodological and worldview point-of-view.

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The characteristics of cognitive science and the opinions about it, which are recalled above, indicate three issues that are important for the topic of this article. Firstly, cognitive science is deeply entangled in philosophical discussions on the nature of cognition, knowledge, and the human mind. Inheriting rationalism and logicism of Western civilization, it constructs a new methodological approach, which is computatlionalism, and, on this base, it creates a new cognitive and worldview perspective on the human being's role in the world and nature; by introducing the concept of the artificial intellect, it reanimates in a distinct way the old myth of the Golem (cf. WIENER 1964; HETMAŃSKI 2006). Secondly, the specifics of cognitive science were influenced from the beginning, as well as from today, by methodologically-diverse exact sciences, the terminology and research methods of which imposed on it their elements and created its specifics. Their typical notions and disciplines, such as algorithm, information and information processing, computation, software and hardware, model and simulation, leave their imprint on cognitive science; traditional problems and dilemmas appear in a new and intriguing as well as controversially terminological apparel. Thirdly, the empirical and practical character of such foundational disciplines like computer science, linguistics, neurosciences, artificial intelligence, robotics, and artificial life leads to an assumption of the character of practical projects with technologically multilateral applications. A clearly applicational, practical character of the field is emphasized, both in reference to the general as well as to the detailed concepts. Generally speaking, cognitive science has currently assumed the form of a homogenous discipline, which in the period of its emergence from a broad body of philosophical knowledge as well as from several initial scientific disciplines both influenced by academic, governmental, and corporate institutions and in the scope of an intellectual ferment of many theoreticians and researchers, mainly from the analytical philosophy, is currently heading in one direction. It is guided by, according to Gardner's account, computationalism, representationalism, connectionism, parallel distributed processing, modularity, intentionality, and algorithm-heuristic problem solving. The period of the crystallization of the basic categories, notions and terms, the time of the revolutionary or even counter-revolutionary forming of the new theoretical perspective and research paradigm, the stage of (in fact several stages that are still anyways new) the technological and social applications of interdisciplinary knowledge, and the faze of a new worldview or even of a distinct ideology of computationalism, are nowadays the constitutive parts of the established scientific discipline. Cognitive science has had a brief history, inheriting a broad and old tradition, and has been subjected to the typical regularities of a scientific discipline, welded in many crucibles of knowledge, with the contributions of numerous research and social practices. It is a mature discipline waiting for a model approach and appropriate assessment.

3. FOUCAULDIAN MODEL OF KNOWLEDGE AND SCIENTIFIC DISCIPLINE

On multiple occasions, Michel Foucault undertook epistemological reconstructions of the process of the formation of scientific disciplines from various types of social experiences as well as from institutions associated with them. He recreated the historical and theoretical circumstances constituting medicine, psychiatry or disciplines in the field of the humanities. He described his method as an "archaeology" of knowledge, pointing to its dissimilarities in relation to traditional epistemological, methodological, or historical analyses. It consists of a reconstruction (one can say, modelling) of the conditions for the possibilities of the emergence of various types of cognition and knowledge, which fully gain the status of *episteme*. As he writes in his most mature work wherein he summarizes the specifics of his research method, *The Order of Things: An Archaeology of the Human Sciences* (= FOUCAULT 1973): „[W]hat I am attempting to bring to light is the epistemological field, the *episteme* in which knowledge […] manifests a history which is not of its growing perfection, but rather that of its conditions of possibility; in this account, what should appear are those configurations within the *space* of knowledge which have given rise to the diverse forms of empirical science. Such an enterprise is not so much a history, in the traditional meaning of word, as an 'archaeology' " (FOUCAULT 1973, xxii). One can treat Foucault's method as a *model* of the emergence and the development of a mature scientific discipline, which based on fractographic knowledge (about its creators, distinct issues as well as the institutions, which condition and support it), allows the grasping of its unapparent specifics and cognitive potential. Such a model seems to be incredibly useful in examining the *synchronic* perspective of not only the factuality (positivity), but also of cognitive *modality* as well as theoretical and practical *challenges*, which are inherent to cognitive science.

3.1. KNOWLEDGE, DISCIPLINES AND SCIENCE

The constituents of knowledge are, according to Foucault, "[…] groups of statements that borrow their organization from scientific models, which tend to coherence and demonstrativity, which are accepted, institutionalized, transmitted, and sometimes taught as sciences […]" (FOUCAULT 2002, 196–197). Knowledge assumes a fundamentally propositional, statement-based form. The main factors establishing knowledge in a given scientific discipline are, namely, different *linguistic expressions* — utterances, statements, theorems, theories, and hypotheses. These acquire the status of valid units, in a particular scientific discipline, which constitute its knowledge; there is no knowledge without statements. Statements are not the only elements constituting a scientific discipline, Foucault notices. Apart from strictly epistemic creations (statements) the *practical activities*, which establish a scientific discipline, are also important. Each new discipline creates further "[…] a great change in the economy of concepts, analyses, and demonstrations […], in short, a whole group of relations that characterized for this discursive practice the formation of its statements" (FOUCAULT 2002, 197). That which fully establishes a given discipline is a set of practical activities called, by Foucault, "discursive formation." It is a formation (in the sense of a mode of the organization of life of a community) of activities and *cognitive-social practices* dominating in a given society. It is characterized by a set of theoretical, as well as practic acts, which, in a given space and time, assume a homogenous and distinguished form. These actions, as Foucault states, express, apart from that, a particular form of *power* exerted by society toward those, who create and develop *knowledge* and the scientific discipline. Knowledge and the scientific discipline referring to it are results of the manifestation and function of authorities, which leave a trace in the discursive formation and its practice — from literary or administrative through scientific to political ones: "[T]his practice is not only manifested in a discipline possessing a scientific status and scientific pretensions; it is also found in operation in legal text, in literature, in philosophy, in political decisions, and in the statements made and the opinions expressed in daily life" (FOUCAULT 2002, 197). In the practice of formulating scientific knowledge and the discipline dedicated to it, there are many factors in motion and their mutual relations assume the form of a distinct game ruled by its own rules. In order to analyze the full and mature state of the knowledge at hand and the discipline dedicated to it, Foucault states that one must indicate "in accordance with which rules a discursive practice may form groups of objects, enunciations, concepts, or theoretical choices"; the author calls such a state "positivities." Although the system of connections between these elements is not strict, nor does it constitute a complete structure of science, the result of their cooperation is that "[t]hey form the precondition of what is later revealed and which later functions as an item of knowledge or an illusion, an accepted truth or an exposed error, a definite acquisition or an obstacle surmounted" (FOUCAULT 2002, 200). From such discursive practices indeed, a fully mature and constituted *scientific discourse* emerges. The properties of scientific discourse are formal elements, such as its rigor, accuracy, and methodological maturity, but also more concrete and content-rich elements such as the "types of enunciation that it uses, the concepts that it manipulates, and the strategies that it employs." Science that is fully mature, as Foucault concludes, does not connect with that, which was barely (or only) experienced, "but with that which must have been said — or must be said — if a discourse is to exist that complies, if necessary, with the experimental or formal criteria of scientificity" (FOUCAULT 2002, 201).

The set of the abovementioned practices constitutes, as the author of *Archaeology of Knowledge* states, that which can fully be called *knowledge* (*savoir*). There is no knowledge without its designated, discursive practices. Experiencing reality (individually or collectively), or having bits of information per se (merely unitary quantities of information) is not yet knowledge; experience does not reach a level of knowledge without the necessary social practices. Knowledge is a complex and emergent epistemological category: "Knowledge is that one can speak in a discursive practice, and which is specified by that fact: the domain constituted by the different objects that will or will not acquire a scientific status […]; knowledge is also a space in which a subject may take up a position and speak of the objects with which he deals in his discourse […]; knowledge is also the field of coordination and subordination of statements in which concepts appear, and are defined, applied and transformed […]; lastly, knowledge is defined by the possibilities of use and appropriation offered by discourse […]" (FOUCAULT 2002, 201–202). As the philosopher says, knowledge functions in three dimensions (in "spaces" as he also calls them): (1) Activities of *speaking out* by the subject of particular knowledge (in a propositional sense and thus in assertive statements), as well as other cognitive actions such as questioning, looking, reading, registering and determining the adequacy and trueness of that, which is experienced; (2) The whole set (potential and formal) of modes and sites *in accordance* with which one can integrate and adjust each new statement of current discipline with the whole of what has been already said; (3) Possibilities of *applying* them in particular social situations as well as in extra-scientific discourse.

Foucault draws particular attention to the last activity (realm of applications), stating: "[T]here is no knowledge without a particular discursive practice; and any discursive practice may be defined by the knowledge that it forms" (FOUCAULT 2002, 202). Every knowledge emerges from the proper *practice*, which takes the shape of *discursive* practice. If such types of knowledge, which are independent from a given science, exist (i.e. they do not constitute and do not create science at any stage of its development), then there is no scientific knowledge, which would emerge withoot any practice at all. The origin of knowledge is always a particular discursive practice, which grants it its distinct form. It is precisely the archeology of knowledge that focuses on such a correlation and its forms (i.e. not the discipline itself, but the process of its creation); archeology, as Foucault writes, "explores the discursive practice/knowledge (*savoir*)/science axis." Thanks to it, one can recognize and examine the complex process of science emerging from an area (field) of knowledge.

In the discursive formation, mainly in the set of adequate practices, knowledge reaches the level of science and adopts the form of a scientific discipline. Foucault distinguishes four key stages and levels of this process, which he calls "thresholds." These are in order: (1) the *positivities* threshold, which appears in the beginning of a discursive formation, when one common system of expressing oneself within a given discipline is formed; when a particular type of expression begins to appear in this system then, what emerges is (2) the *epistemologization* threshold, which attempts to impose one distinct and dominating *set* (not the entire system) of expressions on the entire discursive foundation (which aspires to dominating and standardizing the feature in this discourse), considered valid, verifiable, etc.; after acquiring by such a set of expressions (it thus becomes the dominating language of the discourse) the rank of formal rules and the regulations for constructing broader expressions (e.g. laws or principles), (3) the *scientificity* threshold emerges, which characterizes more fully (although still not ultimately) a given discipline; and, finally, (4) the *formalization* threshold defines the threshold of scientificity because, through the introduced axioms, statement structures, and their transformation, it endows the entire discursive formation with its formal shape.

The sequence of thresholds, their mutual dependencies, inferences, and oppositions are not always the same in the development of scientific knowledge; a variety of regularities rule them and there are, as Foucault admits, no analogies between them and biological or evolutionary progress (which often appear in the history of science): "Their chronology, in fact, is neither regular nor homogeneous" (FOUCAULT 2002, 206). It is possible that two different thresholds of epistemologization can change, within a particular scientific discipline the positivity specific to it, establishing, simultaneously, two divergent thresholds of scientificity; the history of the natural sciences of the nineteenth century — as Foucault indicates, referring to the examples of so-called natural history, experimental medicine, biology, or microbiology — is full of disparities between the thresholds in the development of their general discursive formations; this makes archeology of knowledge an especially important analysis of knowledge as such.

In the analysis of scientific knowledge, the recognition and appropriate interpretation of key moments is important — both historical ones (i.e. turns and revolutions) as well as epistemological ones (i.e. the validity of knowledge and its justification). This is accomplished precisely by the archaeology of knowledge. It uncovers "epistemological figures," which appear when the practices of a given discursive formation enable the transition between the scientificity threshold and the epistemologization threshold — that is, the transition within the realm of a given discipline from its pre-scientific to its strictly scientific stage. It is then that the key notion for a given field of knowledge and discipline ("still overlaid with metaphors or imaginary contents" as Foucault accurately notices) becomes purged of its early visual-figurative forms and gains the status of a scientific notion; it is then that the metaphoric language transforms into an exact and formal one — the metaphoric discourse becomes a scientific one. At the threshold of epistemologization, knowledge assumes a distinct state of *self*-awareness and presents itself as a universal, ready-to-use and complete type of knowledge: "Consequently, this description takes as its norm the fully constituted science; the history that it recounts is necessarily concerned with the opposition of truth and error, the rational and the irrational, the obstacle and fecundity, purity and impurity, the scientific and the non-scientific. It is an *epistemological* history of the sciences" (FOUCAULT 2002, 215). Such a description of scientific knowledge is as historically appropriate as it is theoretically exaggerated, for these model oppositions are rarely an achievable ideal. Such state of affairs — "a whole set of differences, relations, gaps, shifts, independences, autonomies, and the way in which they articulate their own historicities on one another"—nevertheless should be revealed in an "archeological" project and epistemologically interpreted, concludes Foucault.

What is epistemological interpretation then? Foucault calls it "the analysis of the *episteme.*" By *episteme*, he understands not (as the tradition of European epistemology requires) "a world-view, a slice of history common to all branches of knowledge, which imposes on each one the same norms and postulates, a general stage of reason," but *a set of cognitive practices of discursive formation* that is possible to reconstruct, relative and changeable. Such analysis is the description of the transition of the knowledge thresholds levels: epistemologization, scientificity, and formalization achieved with the aid of discursive practices: "The episteme is not a form of knowledge (*connaissance*) or type of rationality […]; it is the totality of relations that can be discovered, for a given period, between the sciences when one analyses them at the level of discursive regularities" (FOUCAULT 2002, 211). The description (analysis) of episteme is never completed; it is a *reconstruction* that is constantly done anew; it is a *metatheoretical* and self-tackling activity, but not the result. It is not, although it sounds paradoxical, knowledge in the sense of "science of all possible cognition"—that what can, in general, be known in a given epoch; it is not a "motionless figure that appeared one day with the mission of effacing all that preceded it," but—on the contrary—it is "a constantly moving set of articulations, shifts, and coincidences that are established, only to give rise to others" (FOUCAULT 2002, 211). The undeniable advantage of such a description is that it enables looking at knowledge, in a way, externally—i.e. looking specifically at the process of *constituting* it and not only at the finalization of that process—its result. In addition, analyzing episteme reveals the conditions for knowledge, not in the aspect of limitations, but in its constitutive factors: "[T]he episteme makes it possible to grasp the set of constraints and limitations which, at a given moment, are imposed on discourse" (Foucault 2002, 211).

3.2. SCIENTIFIC KNOWLEDGE AND IDEOLOGY

When knowledge achieves its full dimension—that is, when it appears in three spaces (expression, compatibility of the statements, and application) as well as when it crosses four thresholds (positivity, epistemologization, scientificity, and formalization)—it achieves a fully *scientific* status. But, as Foucault strongly emphasizes, it does not only express its essence in itself.

The moment that knowledge achieves a level of science, when it expresses itself and fulfils itself in a particular scientific discipline, it simultaneously departs from that area and begins to play extra-epistemological roles — mainly social, economic and political: "Knowledge is to be found not only in demonstrations, it can also be found in fiction, reflexion, narrative accounts, institutional regulations, and political decisions. […] Knowledge is not an epistemological site that disappears in the science that supersedes it. Science (or what is offered as such) is localized in a field of knowledge and plays a role in it" (FOUCAULT 2002, 202). This role is the ideological entanglement of scientific knowledge and concrete disciplines in the social practices, which differ from the strictly scientific rules and principles. Knowledge is clarified by *ideology*. The ideological role of scientific knowledge depends directly on the social discursive practices, which create knowledge, it depends also on the type of society in which science functions.

The ideological role of knowledge and science does not decide about their limitations or imperfections; ideology is the constitutive element of knowledge and not an obstacle or limitation for it. The relation between science and ideology is much more complex, than is indicated by the traditional understanding of ideology (e.g. as false awareness). Ideology does not exclude a possible scientific character; as the author of *The Archaeology of Knowledge* states — it is its constitutive element. The problem of the relation of ideology to scientific knowledge is the problem of the functioning of scientific knowledge in a particular discursive practice; it is always a relative, concrete problem. Science (in this case — a specific scientific discipline) plays an ideological role from the moment that discursive practice brings it into existence. Examples of such a situation, broadly discussed by Foucault, are political economics and clinical medicine (both of them created at the end of the eighteenth century), the ideological circumstances of which (including practical and political) contributed to their emergence as scientific disciplines. The specifics of the ideological side of the discursive practice of a particular science are the existence of contradictions, gaps, lacunae, theoretical mistakes and inaccuracies within its realm, which do not contradict the scientific ideal. This side of scientific practice, seemingly internally contradictory or "unscientific," is removed by the discourse itself during its development. "By correcting itself, by rectifying its errors, by clarifying its formulations, discourse does not necessarily undo its relations with ideology. The role of ideology does not diminish as rigour increases and error is dissipated" (FOUCAULT 2002, 205). The connection of science and ideology does not burden, but enriches it. This historical fact should be projected onto the assessment of the practical and political entanglements of scientific knowledge. The examination and understanding of such correlations should not lead to the discarding or negating of forms of socially, politically, or technologically entangled knowledge (technology always expresses a particular ideology) as imperfect or evil. Discovering the actual role of ideology in science consists of recognizing and examining (epistemologically and sociologically) "the system of formation of its objects, its types of enunciation, its concepts, its theoretical choices. It is to treat it as one practice among others" (FOUCAULT 2002, 205).

When summarizing the Foucauldian *model of knowledge* development and scientific discipline formation, it is worth noting that it enables observing knowledge from a level of epistemological and methodological analyses, which are very universal and at the same have the possibility of undertaking detailed analyses of concrete types of knowledge, methods and practices, which constitute and change the scientific discipline. A closer look at two distinctive syntheses of cognitive science, conducted both by its creators and historians, will allow presentation of the value of the French philosopher's model. This model, which is significant, was constructed parallelly to the emergence and development of cognitive science and to an incredible extent, accurately grasps its essence.

4. COGNITIVE SCIENCE AS *EPISTEME* AND DISCURSIVE PRACTICE

The Foucauldian model of knowledge and scientific discipline formation is an example of epistemological-methodological (conceptual-categorical) analyses combined with research on specific types of knowledge, methods and practices, which constitute a scientific discipline. A closer look at two syntheses of cognitive science, this time, carried out by its creators and historians — Margaret Boden (2006) and José Luis Bermúdez (2016) — will allow us to present the value of the French philosopher's model. What is significant is that this model was constructed parallelly to the emergence and development of cognitive science (i.e. during the sixties of the last century) and in remarkable fashion — indeed, in an anticipating manner — accurately grasps its essence. It is thus shown from how many scientific disciplines, with the input of the philosophical concepts of mind and cognition, based on information technology tools and formal-quantitative methodology of research, a homogeneous type of knowledge on human cognitive processes emerged, which became the bedrock for the interdisciplinary science. Using the terminology of the French philosopher, one can say that cognitive science is the effect of reformulating the general knowledge of the mind and cognition. These, due to numerous discursive practices, took place in favorable social conditions, in which precisely this type of knowledge was equally important both scientifically and politically. The Foucauldian model is an anticipation of that, which is more and more frequently noticed within cognitive science itself. The discipline is reaching that level of maturity, which can be recognized and described from a perspective denoted by "archaeology of knowledge."

4.1. Cognitive Science as the Struggle of Ideas

Margaret Boden — the author of the monumental monograph *Mind as Machine: A History of Cognitive Science* (= Boden 2006) — in both an intelligent and metaphorical manner, states that the universal nature of cognitive science adopts the form of a nearly religious discourse, when describing the role of the mind in nature, its emergence and creation: "Cognitive science is a *catholic* [italic added] field, in three ways: First, it covers all aspects of mind and behaviour. […] Second, it draws on many different disciplines in studying them. And third, it relies on more than one kind of theory. Broadly speaking, it's the study of *mind as machine* — a definition that covers various types of explanation" (Boden 2006, 9). The phrase, "a catholic", means, according to her (in accordance with a rich and indeed ambiguous etymology of the word[1]), both the universality and commonness of the titular discipline and its knowledge, as well as the liberal character and tolerance of the cognitive and methodological perspective which cognitive science delineates.

Initially this discipline had, as Boden points out, tendency to understand the term "cognition" in a narrow (i.e. orthodox) way as something encompassing exclusively (merely) perception, remembering, thinking, reasoning, and problem solving, with the symptomatic exclusion of emotions and motivations. Only later, during the development and broadening of the subject

[1] "Catholic" according to *The Concise Oxford Dictionary* means, apart from "universal; of interest or use to all men," also „all-embracing, of wide sympathies, broad-minded, tolerant" (*The Concise Oxford Dictionary* 1984, 146).

matter (and this liberalization), which began to characterize the discipline in the subsequent decades of its development, to which also began to be incorporated extra-intellectual, cognitive activities (adding attention as well), thus broadening the meaning of the crucial term to not only individual cognition, but also to group and social ones, and even to cognition beyond a human level as well as to animal cognition and — what is most important — automatons and machines, an example of which came to be described as so-called artificial intelligence. The "catholic field of cognitive science", therefore, became an *interdisciplinary* field of scientific research, including also philosophical concepts and speculations. In the initially used term "cognitive studies" (still before elaboration of the contemporary name of the discipline), the emphasis was initially put, as Boden notes, on a narrow (i.e. exclusive) understanding of the term *cognitive* and after that on the term *studies* as a set of various research methods — mainly on simulation used for modelling cognitive processes. Cognizing cognition was treated as a type of modelling (idealizing and simulating) that was considered, according to the specifics of these methods, to be cognition. In the seventies of the last century, the term "studies" was ultimately also replaced by the more unified term "cognitive sciences," in which the plural form of the word emphasized the multi-topic character and methodological diversity of the new, maturing scientific discipline. Ultimately the name (yet in the singular) "cognitive science" settled, by which most researchers express their conviction on the homogeneity and universality (this broadly understood "catholic" nature) of the new science. This corresponded with the broadening of the research subject-matter as well as with the inclusion, in the scope of the original term "cognitive" (too narrow in the new context), of an extremely diverse array of mental phenomena such as self-cognition, reflexivity, unconsciousness, intuitiveness heuristics etc., analyzed in connection with neurological phenomena: "To understand the mind (mind/brain) properly one doesn't only need to look at it from all directions: one must also *integrate* the various views" (BODEN 2006, 12). Cognitive science has ultimately become a fully-formed scientific discipline, taking the shape of a mature science.

This is signified by its peculiarly cognitive-practical, double nature, because it consists of: (1) sophisticated theories of mental and cognitive phenomena, including speculated concepts of artificial intelligence and so-called artificial life as well as (2) an array of practical scientific applications (simulation, modeling, virtual reality), as well as extra-scientific applications (mass communication, entertainment, e-learning, etc.). It is an extra-scientific discipline entangled in numerous extra-scientific relations: „More precisely, cognitive science is *the interdisciplinary study of mind, informed by theoretical concepts drawn from computer science and control theory.* […] Broadly speaking, computational concepts consist of two main types. On the one hand, they're drawn from computer science, AI, and software engineering. On the other hand, they hail from information theory and control engineering — in a word, cybernetics" (BODEN 2006, 12–13). It is not only the expression of the idea assuming the possibility to achieve complete cognition of human cognitive processes, but also their simulation, recreation as well as control. Ultimately, as Boden metaphorically says: "Cognitive science is a rich intellectual tapestry, woven over the years from many different threads" (BODEN 2006, 18).

Several predominant ideas emerged within half a century of cognitive science history — diverse, mutually contradictory, and divergent in their final conclusions. Among them, as Boden writes, the first "intellectual countercultural somersault" (since the fifties of the last century) that left a permanent imprint in the field was the idea of *computationality.* It was formulated during the mathematical debate on the nature of recurrent proofs — their advantages as well as their limitations. It was widely promoted, thanks to Alan Turing and the concept of the Turing machine, throughout the entire cognitivist movement, including cognitive psychology, philosophical anthropology, and the theory and practice of processing information as well as in several other disciplines. Computationality assumes that cognition is a process of processing any given signals according to reliable algorithms that are possible to be implemented in any kind of systems, regardless of their material nature, and that computation takes place in computers as well as in minds. This can be carried out and controlled by one distinguished central unit. This idea expresses the belief of almost all cognitive scientists in the effectiveness and universality of algorithmic procedures as fundamental for the functioning of any complex systems.

In the middle of the eighties, as Boden notices, the second suggestive idea of the "society" of mind emerged, formulated by Marvin Minsky and Seymour Papert, which assumed the existence, in any given system, of not one, but many centers participating in its functioning. The term "society," which began to be used at that point meant an aggregation — a loose array of numerous elements processing information in a complex system. According to Minsky, it was thanks to this that the mind began to be modelled not with the use of algorithms (which was believed by the first generation of cognitive scientists, including himself), but also within the so-called decentralized and dispersed architecture. This is accomplished despite an effective description the functioning of these human mental and corporal activities. The clashing of the idea of computationalism and of the "society" of mind — partially juxtaposed yet partially complementary methodologies — is also a manifestation of the feud between two universal concepts symptomatic for cognitive science — the centralized and decentralized interpretation of the human being, its place in the world, and its relation to him. This motif is permanently present in it. Referring to Foucault's model (to which Boden's remarks apply remarkably accurately), one can say that, within cognitive science, mutually juxtaposing yet unavoidable, particular *discursive practices* are expressed in the form of the transition from one positivity threshold to a few epistemologization thresholds, and then to formal thresholds. These practices — consisting in computer modelling and simulating of mental phenomena as well as in the construction of artificial intelligence replacing, or at least augmenting, human thinking — at each stage of the development of cognitive science, contribute new contents and form to its specifics.

Among discursive practices of cognitive science, one can distinguish an interpretation treating cognition as if it were distributed, dispersed, and embodied. It overlaps with the aforementioned tendency of decentralizing computational mechanisms; for it assesses that not one centrally distinguished (on a superior level, in a macro-scale) "agent" fulfils cognition as such, but that many "agents" (on lower levels, in a micro-scale) participate in a dispersed and multi-directional mode of cognition. The action of many separate agents is the foundation of coherent behavior of the main agent; its complete behavior emerges from the actions of particular, decentralized agents. The idea of dispersed cognition expresses (referring to Foucault's model) the discursive practice (one can say ideology) of a free and decentralized mode of the functioning of objects in any systems; in this way cognitive science expresses through itself (free from the influence of a singular algorithm so in a specific way—"liberal"), the idea of the unconstrained action of many elements within any kind of cognitive systems. In other words, the concept of *dispersed* cognition is the reflection of the political idea and the social practice of a *liberal* society.

Within the Foucauldian model one can interpret, as Boden seems to suggest, another dominant concept within cognitive science (one of the "intellectual counter-revolution somersault"), which is the connectionism that "flourished and seduced the public at large — and even some postmodernist philosophers—largely because of its decentralized approach" (BODEN 2006, 33). It is an example of the influence of the cultural environment on cognitive science. It is a competitive concept to computationalism with its centralistic manner; for it denies the existence of a distinguished central computation unit and speaks of parallel processing of the information connected to signals in computers as well as in the brain. It is, contrary to appearances, one of the first concepts of the cognitivist current reaching back to the idea of Alan Turing himself on the possibility (or even necessity) of the existence of random and parallel, computational mechanisms in biological as well as in machine systems. Developed by cyberneticists and cognitive psychologists, it entered into psychology and the philosophy of mind as a competitive model of the human mind, acquiring a formal and mathematical framework. Connectionism in its mature and universal form is an example of the transition of a general idea to the final threshold (according to Foucault) of formalization after the prior transformation from the epistemologisation threshold (when connectionism became a competitive model to the computational one) to the scientificity threshold, whereupon it became the dominant model for biological as well as for artificial systems, and rather than just a philosophical idea.

4.2. The Integration Challenge through High-Level Reduction

José Luis Bermúdez (2016), by carrying out a broad overview of the topic of cognitive science as well as its development, states that it has reached a level on which *integrational* tendencies are signified both in problems as well as in methods. He points to the issue, which the discipline has to currently confront, defining it as the "intertheoretical reduction." He notices, at the beginning, that the old model of the interdisciplinarity of cognitive science, which was described by George A. Miller and Howard Gardner (cf. chapter 2 of this paper) is already inadequate. The hexagonal model (elaborated by a group of researchers under the auspices of the Sloan Foundation) limited the number of disciplines and did not include all possible connections between them, e.g. the link between philosophy and neuroscience (which became a fact in the eighties of the last century due to the research and publications of Patricia Churchland), or the significance of evolutionary biology or ecological ethology. The current state of the interdisciplinarity of cognitive science is much richer than it was initially assumed to be and, to a greater degree, diversified. *Integrational* tendencies are also present within it; they depend on a multi-directional and multi-level diversification of both research fields and research methods and, subsequently, on the emergence of new theoretical and methodological levels.

Using the categories of the Foucauldian "archaeology of knowledge," it should be said that general *knowledge* of the mind and cognition — which cognitive science formulated in the first decades, after crossing the thresholds of positivity, and epistemologisation, and after forming its research methods — brings about the formation of a new level (the fifth threshold?) of theoretical and methodological *integration*: "[T]he different disciplines in cognitive science operate on different levels of analysis and explanation, with each exploring different levels of organization in the mind and the nervous system. […] There are often specific disciplines or sub-disciplines corresponding to these different levels — disciplines with their own specific tools and technologies" (BERMÚDEZ 2016, 88).

The current stage at which cognitive science is situated can be described as the integration *challenge*; it is a challenge, which comes from the mature form of this discipline entering the stage of even more advanced development. This challenge may assume, as Bermúdez states, two versions, and expresses itself in two *models*. In the first model that can be described as *inter-theoretic reduction*, which would depend (just as it was, as he remarks, with thermodynamic physics and its reduction of general laws to laws of the conservation of energy and the increase entropy) on the creation of "interconnected groups of laws" describing mental phenomena. The second model, which cognitive science can adopt in its development, is the *mental architecture approach,* wherein the mind is apprehended functionally and holistically. Bermúdez states that the second model is not as controversial as the first and even has a greater chance to be developed. "Specifying a mental architecture involves: (1) a model how the mind is organized into cognitive systems, and (2) an account how information is processed in (and between) different cognitive systems" (BERMÚDEZ 2016, 135). In each of these cases, the integrational challenge will ultimately rely on (using an element from the "archeology of knowledge" model) creating new *episteme*; there are always *many* epistemes in the process of scientific development of cognitive science.

Indeed, such an integration is a form of metatheoretical reduction, but, nevertheless, it is not a simplification of the research subject or of the methods in the discussed discipline. This integration is supported by an array of extra-theoretical factors such as ongoing discussions, institutions, laboratories, research projects, etc.; all the more this task has the nature of a multi-directional challenge, which takes part in the discursive practice of the information (knowledge-based) society: “This is a challenge of providing a unified theoretical framework encompassing the whole ‘space’ of the cognitive science” (BERMÚDEZ 2016, 110). This integration takes the shape of two “local” (i.e. micro scale) integrations: (1) “where cognitive scientists have built bridges across disciplines”, as well as (2) “across levels of explanations in order to gain a deeper theoretical understanding of a particular phenomenon” (BERMÚDEZ 2016, 110). Integration happens to distinguished disciplines which have reached a high level of methodological development and practical applications. In particular, Bermúdez admits, the first case of integration depends on bringing the psychology of reasoning into contact with evolutionary biology and game theory, while the second depends on exploring the connections between two different tools for studying the activity of the brain (and subsequently the mind’s states), namely microelectrode recording and functional neuroimaging. Thus, the integration process is characterized by two aspects: (1) emerging new areas and problems of research and (2) new methods of studying them. All disciplines as well as emerging and evolving sub-fields that exist in cognitive science, ultimately differ across three dimensions: (1) “the *type* of cognitive *activity* that they are interested in”; (2) “the *level* at which they *study* it”; and (3) “the *degree* of the resolution of the *tools* that they use [italics added]” (BERMÚDEZ 2016, 110). In other words, the integration which takes place in cognitive science depends on *categorial* integration, through which (subsequently to the dimensions listed above) both new *types* of cognitive processes, like imagery and degrees of *studying* them, as well as the new *methods* and *instruments* of research like neuroimaging, are broadly and fruitfully used.

The consequence of the integrational role assumed by cognitive science in contemporary science is also, according to Bermúdez, elaborating subsequent (after prior, also successful) applications of its role in economy and society; it is a civilizational role, which a discipline that has achieved maturity fulfils, after going through all of the developmental stages (“ideologyness” in the Foucauldian sense). The interest in the processes and mechanisms within the brain, especially neuron-like networks implemented in robots, raises hope for the construction of evermore sophisticated artificial intelligences, as long as they will be constructed according to the assumptions of the computationality concept: “Cognitive science certainly predicts that type of *neuroprosthesis* ought to be possible, if cognitive systems are computational devices […]. If this can be done, then the only obstacles to building neuroprostheses are technological" (BERMÚDEZ 2016, 484). An equally optimistic task is to be accomplished in education, in which an ever-broader use of the rules of learning and teaching will take place. This shall be based on "learning technologies that are derived from specific models of cognitive architecture" (an example of it, mentioned by the author, is the Adaptive Control of Thought-Rational, imitating the process of learning a system on the symbolic and modular level), which, in turn, allows one to "work out the specific problems that students are likely to have in, for example, learning mathematics and then to suggest learning strategies for overcoming those difficulties" (BERMÚDEZ 2016, 484–485). Computational models will not only model and simulate, but also strengthen cognitive processes—mainly, however, as the author assumes, those with an algorithmic and intellectual nature. It will similarly be the case with the usefulness of cognitive science, as far as legal studies go, in which, for example, the problems with the credibility of eyewitness testimonies could be eliminated (or at least limited) by introducing to judiciary proceedings procedures built on the basis of experimental research. Thus developed models of decision-making may improve the actions of the jurors and judges. Succinctly stated: (in reference to the Foucauldian model) the theories and tools of cognitive science, which were initially created through the application of computer technologies, are subsequently are meant to contribute to the development of further discursive practices.

5. SUMMARY

The history of the creation and the development of cognitive science, as the analyses in this article (which were conducted according to the Foucauldian model) show, is a complex historical, social and methodological process. *Interdisciplinarity* (as well as *transdisciplinarity*) is the main property — one, which adopts both centrifugal and centripetal tendencies. The stimulus of these changes is manifested in the specialization of knowledge and research — which is unavoidable taking into account the fact that since its beginning, cognitive science was co-created by specific disciplines (from psychology through neuroscience to computer science), which contributed to its diverse and extensive body of knowledge and which supplemented it with numerous research methods. As the theoretician of cultural history, Peter Burke, writes: "In history of knowledge centrifugal movement toward more and more deepened specialization is partially compensated by some concentric trends" (BURKE 2012, 184). Specialization has, therefore, contributed to this, namely, that after decades of *centrifugal* tendencies leading to its broadening (i.e. the emergence of increasingly specialized sub-disciplines), a *centripetal* movement (*integration* through constitution of new levels and spheres of general knowledge about the mind and cognition) was simultaneously present. Thus, new *episteme* emerge together with their growing explanatory and predictive power in relation to the mind, including that of artificial cognition. In relation to such a state of affairs — a higher level of integration of cognitive science is the effect of the cooperation of both personal factors (the first founding fathers, and subsequent generations of researchers and critics) as well as of institutional ones (universities as well as research centers, programs and projects) — Foucault's saying that "nobody creates disciplines" finds its confirmation; disciplines form, or one can say — evolve, as a result of the simultaneous actions of numerous different factors, Burke adds. His remark that "New disciplines are in substance heterogeneous" refers not only to people creating cognitive science, but also to the research problems and methods as well as to cognitive perspectives or ideas, which contribute to forming it. The state, in which cognitive science is situated after the first decade of the new century, seems to confirm the aforementioned diagnoses.

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ARCHAEOLOGY OF COGNITIVE SCIENCE:
MICHEL FOUCAULT'S MODEL OF THE COGNITIVE REVOLUTION

Summary

The article presents an epistemological and partially methodological analysis of cognitive science as a scientific discipline, created as a result of the transformations that took place in the philosophical and psychological concepts of the mind and cognition, which were carried out with the aid of tools and methods of modelling as well as through simulating human cognitive processes and consciousness. In order to describe this interdisciplinary (transdisciplinary) science, and its positions, as well as the stages and directions of its development, it makes use of the epistemological model formulated by Michel Foucault, in which he draws attention to social, ideological and technological conditions of scientific knowledge (*episteme*). The opinions of the leading creators and critics of cognitive science, such as George A. Miller, Howard Gardner, Margaret Boden and José Luis Bermúdez are referenced to and analyzed with the use of this model. The article shows the epistemologically and methodologically divergent status of cognitive science, as well as its cognitive and institutional conditions and challenges, which stand before it after half a century of intensive development.

ARCHEOLOGIA KOGNITYWISTYKI —
MICHELA FOUCAULTA MODEL REWOLUCJI KOGNITYWNEJ

Streszczenie

W artykule przeprowadzono epistemologiczną i częściowo metodologiczną analizę kognitywistyki (*cognitive science*) jako dyscypliny naukowej, która powstała wskutek przeobrażeń w filozoficznych i psychologicznych koncepcjach umysłu i poznania poprzez zastosowanie w nich narzędzi i metod modelowania oraz symulacji ludzkich procesów poznawczych i świadomości. Do opisu powstania tej interdyscyplinarnej (transdyscyplinarnej) nauki, jej etapów, stanowisk i kierunków rozwoju przyjmuje się model epistemologiczny sformułowany przez Michela Foucaulta, w którym zwraca on uwagę na społeczne, ideologiczne i technologiczne uwarunkowania wiedzy naukowej (*episteme*). Dzięki niemu referowane i analizowane są opinie o kognitywistyce takich czołowych jej twórców i krytyków, jak George A. Miller, Howard Gardner, Margaret Boden i José Luis Bermúdez. Ukazany został zróżnicowany epistemologiczno-metodologiczny status kognitywistyki (*cognitive science*), jak też jej poznawcze i instytucjonalne uwarunkowania oraz wyzwania, przed którymi stoi po półwieczu intensywnego rozwoju.

Key words: archaeology of knowledge; cognitive science; epistemology; knowledge; science discipline; Michel Foucault.

Słowa kluczowe: archeologia wiedzy; kognitywistyka; epistemologia; wiedza; dyscyplina naukowa; Michel Foucault.

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