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## Problems of interdisciplinarity : metaphysical and methodological issues

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Studia Philosophiae Christianae 47/3, 93-104

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2011

Artykuł został opracowany do udostępnienia w internecie przez Muzeum Historii Polski w ramach prac podejmowanych na rzecz zapewnienia otwartego, powszechnego i trwałego dostępu do polskiego dorobku naukowego i kulturalnego. Artykuł jest umieszczony w kolekcji cyfrowej [bazhum.muzhp.pl](http://bazhum.muzhp.pl), gromadzącej zawartość polskich czasopism humanistycznych i społecznych.

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## PROBLEMS OF INTERDISCIPLINARITY (METAPHYSICAL AND METHODOLOGICAL ISSUES)

**Key words:** interdisciplinarity, multidisciplinary, methods, ontological status of objects, compatibility, complementarity

The concept of interdisciplinarity belongs to one of the new and perhaps the most dynamically developing approaches in current scientific and also non-scientific knowledge. There are several reasons why this is so; from the enormous development and subsequent fragmentation of knowledge [Moran 2002], through awareness of the limits of methods and discipline paradox [Klein 1990], to the desire to cross boundaries [Klein 1996] and to solve problems from an all-unifying kind of perspective [NAP 2001]. The desire to find solutions that go beyond the framework and to overcome limits leads thinkers to two phenomena. The first one is an attempt to connect the knowledge of individual disciplines. Modern science, unlike science of the 17th and 18th centuries, suffers from considerable specialization and consequently also from fragmentarization of knowledge, as evidenced by the fact that advances in one area don't have power to directly affect other areas, as time passed they alienated one another greatly, and now it is difficult to find a global link as it was in ancient and medieval knowledge. Interdisciplinarity can thus be seen as building bridges or building continuity.

The second important factor for the development of interdisciplinarity is the opposite process. Permanent process of specialization of sciences brings scientists and thinkers to a separation of problems and exclusion from new disciplines, and thus to building new border areas. We can therefore only agree with the visions which, in relation to interdisciplinarity, perceive the creation of new methods and approaches and subsequent creation of new sciences and disciplines, as in the case of philosophy of mind, or more generally in an area called cognitive studies<sup>1</sup> [Stehr, Weingart 2000].

Although the history of interdisciplinarity is relatively young and its use dates back only to the middle of the last century [Klein 1990], or to the post-war period [Salter, Hearn 1997], the roots of interdisciplinarity and interdisciplinary investigation can be found a long time ago. I believe that they are linked to the very roots and origins of philosophy, particularly with regard to its definition and the hybridization with other gradually emancipating sciences.

It appears that philosophy is characterized by the absence of strict and inviolable methodological procedures, which would confine it into rigid thinking. Some philosophers even say that philosophy actually doesn't have its own method [Popper 2002], which separates it from science. Philosophy has always been characterized by a certain methodological freedom and openness of thought and practice, as well as border crossings and attempts at reflecting on the knowledge of sciences and their incorporation into a single interpretation of the world. Certain methodological freedoms (in comparison with strict scientific procedures) and syncretism in using different methods (Feyerabend's "anything goes" [Feyerabend 1993]) make philosophy – the mother of all sciences – the original prototype of interdisciplinary examination. And these methodological and epistemological aspects of philosophy

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<sup>1</sup> The field of cognitive studies is a good example of creation of new areas of knowledge. The actual name of this area proves disciplinarity's lack of clarity and creation of a new discipline of knowledge. In many areas, therefore, we are facing with cognitive science, or cognitive sciences. I assume that in this case we can agree with Repko [Repko 2008], who prefers the term cognitive studies. Studies represent interdisciplinarity as well as epistemological and methodological diversity and especially multivariability of the views and approaches to the problem.

and interdisciplinary investigation will be the subject of our subsequent analysis.

Interdisciplinary investigations have the advantage that they allow their users to use the research results of individual scientific disciplines and to apply them to problems of explanation and understanding, relationships and mechanisms in other areas. Interdisciplinarity thus helps to bridge the gap that arises from greater specialization of individual disciplines and accelerates research in other areas. At the same time it eliminates the boundaries between different approaches and creates a very creative interface of the investigation by generating new problems and their possible solutions. This post-modern approach (within the meaning of modernity as a historical period), however, has both its positives as well as negatives. The first is the question of compatibility of the methods used and related cognitive framework of research.

The classic picture of the philosophical as well as scientific research in the world bears the old Platonic belief that truth, like reality, is only one. We therefore assume that the world, as we recognize it, is independent from us and to have a factual knowledge means to eliminate all subjective, variable and partial aspects of cognition. That is the reason why Western culture initially developed particular knowledge, which touched the eternal and immutable ideas which are not a subject of period or subjective distortions of man (e.g. geometry, arithmetic, logic). An essential feature of this Platonic approach is a particular belief in partiality and the multi-aspect nature of human knowledge. This means that different views present a partial optic or viewpoint from which we look at the object of our knowledge. Such notions of truth enabled Plato to understand knowledge as making up a mosaic of views with the assumption that the results of each examination will fit into each other without problems and thus create a sort of giant puzzle, where subsequent generations amplify and clarify the picture of the world.

Despite the fact that Plato was not ultimately so dominant in the history of Western science as his successor Aristotle, Platonic residue in knowledge remained in the world of science (not only in the sense of examination of ideal objects – anatomy, cynology, etc.), especially

in the understanding of knowledge as a revealing or mirroring of the world.

A large number of scientists and philosophers believe that the role of our knowledge is also to search for methods and approaches that reveal the reality of the world in its best form. Starting with Plato through to Bacon and Newton, we believe that proper examination can penetrate under the skin of nature and compel it to disclose and reveal its secrets. We believe therefore that the subject of investigation reveals to us and our task it is to explore it the best we can.

Another group of philosophers, however, acquired over time a conviction that the objects of our investigations are not completely independent from us – not just in Berkeley terms (*esse est percipi*), but rather in a Kantian spirit. They believed that what we perceive is largely affected by our own optics – our cognitive apparatus. Kantian constructivism tradition, however, didn't mean just the determination of our perception, but ultimately opened the door to a fundamentally different understanding. Under the influence of Neokantian epistemological assumptions, Einstein's theory of relativity and particularly under the work of historians and theorists of science such as Kuhn, Lakatos and Feyerabend, constructivists believe that we don't reveal objects of our cognition, but rather construct them. This implies that what we see is determined by a cognitive and explanatory framework in which we live. Reality is thus not mirrored, but created by our thinking about it [Rorty 2009].

A good example of a conflict of these two approaches is psychology. In the history of psychology we can follow two main lines of historical development, which distinguishes the diversity of methodologies arising from the differences in the basic axioms of ontology of an object's research. The first one is characterized by a scientific examination of exactly demonstrable phenomena such as behavior, reaction time, performance, etc. Behaviorists believe that we can correctly investigate only what is available to observation and what we can accurately measure or quantify. This approach therefore prefers physical or neurological symptoms and believes that our psyche (if there is such a thing) is revealed through behavior. The emphasis on an exact scientific approach thus approximates psychology to natural science, but

with a disadvantage that it doesn't thematize some objects of examination (internal experience).

The opposite example is introspective and projective oriented psychology (e.g. structuralism). This stream, predominantly developing in German-speaking regions, focuses its attention on understanding of experience, introspection and empathizing to the psyche of the individual. It assumes that we create projections of feelings and experiences of others. Psychoanalysis, dynamic and depth psychology, but also many others explain the experience of man through the creation of models and mechanisms of experience, personality etc. They are more or less aware that these are our constructs, which they believe as if they were real. The construction of models enables us to leave the base of naive realism and try to penetrate to places where it is not quite possible by an exact scientific method, although for the price of loss of confidence in accuracy and validity of our interpretations. Thus, it is as if we have realistic descriptive methods (exact sciences) on the one hand, and constructivist projective methods of introspective approaches<sup>2</sup> on the other, while their conjunction is very questionable.

Some philosophers argue that a combination of both approaches is not really possible. They argue with the incompatibility not only of methods (revelation vs. construction) but particularly with the difference of the objects of investigation. While followers of the first approach believe in an objective subject independent from subject and methods, constructivists point to the fact that the method of investigation determines what we see and thus constitutes the very object of inquiry.

Personally, I believe that the argument of ontological difference of examining objects can be eliminated very well. Although, unfortunately, to the detriment to realists. As shown by T. S. Kuhn et al. Baconian conviction of realists that they see the objects themselves (*Kantian Ding an sich*) isn't quite adequate. Within each appearance the expla-

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<sup>2</sup> With some exaggeration we can say that either we know exactly what is happening formally in an organism – the body, but we do not know what it is (significance/value) – behaviorism, or we will examine the experiencing of meanings, but we want to be sure with the accuracy of interpretation. – analogy with Schrödinger's electron or Heisenberg uncertainty principle – either I know exactly the speed, but not location, or I know location but I do not know the speed.

nation background is present in the very experience, a kind of cognitive schema – paradigm by which we see but also interpret the world. Newtonian *hypotesis non fingo!* therefore does not apply, but only ignores a cultural (Kuhn), historical (Foucault) or cognitive (Piaget) framework of our perceptions. The moment of revelation is therefore not revelation of the object, but of our schemes of thinking; and the objects of our viewing are constructed by our cognitive, cultural, historical understanding to a great extent.

Considerably more serious, however, may be a problem with compatibility of the methods of examination. As an example in this context it is often mentioned Bohr's conclusion on examining the nature of light. Niels Bohr et al. demonstrated that whether light will have corpuscular or wave characteristics depends on the way you examine it. The method we use thus determines what we can or cannot see. It thus appears that the method of investigation works as optic, enabling us to see something and hiding other things at the same time. The problem is that it's an optic, without which we cannot see at all. We always have certain optic in our eyes and discarding it means giving up on seeing. Images that it offers us, however, can be and often are incomprehensible<sup>3</sup>. However, more serious is the fact, that the method does not determine just what we see and what not, but even the very existence and nature of the subject itself (its waviness, corpuscularity). Therefore a psychoanalyst, by applying their methods, sees the forces and internal dynamics of personality, because their perception of the observed phenomenon necessarily and causally expects them to be there<sup>4</sup>. Behaviorists perceive behavior as the consequences of conditioning (learning), and thus as a manifestation of their causal interpretation. In other words, between the observed object and method of observation is a clear boundary and therefore the observation method itself also cons-

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<sup>3</sup> Henry H. Bauer, in this context, gives the example of incompatibility of languages. Languages are like methods, different standpoints, but in order to speak understandable, we can't combine them or just switch from one to another. Bauer believes in inability or problematic character of interdisciplinarity and he considers the creation of new interlinguistic languages as monstrous [Bauer 1990].

<sup>4</sup> This is also why the analyst is always right – denial as evidence, acceptance as a proof.

titutes the subject of its examination. However, if so, by using different methods we don't look at the same object from different viewpoints, or optics, we can rather express the thesis that we explore completely different objects<sup>5</sup>. We can use a physical and phenomenological analysis of Beethoven's 9th symphony as an example.

According to the physical description, the subject of this investigation can be divided into sounds, their pitch, duration, frequency, etc. We can thus make the perfect physical analysis, but probably nobody will be able to understand the meaning of this work. On the other hand, a phenomenological analysis doesn't require knowledge of physics, physiology, neurology of cognition, its subject is experience and mainly meanings which are carried by listening to that work. It seems that those two descriptions of the „same“ are not describing the same, because they have „nothing“ in common (one is formal, the other is semantic). It is similar to the description of psyche and brain in the cognitive sciences and philosophy of mind.

One approach favors exploring the brain and the so-called descriptive approach from a third person. Therefore, neuroscientists believe that by examining the brain they examine the mind. What they see, however, is only the brain and its manifestations. Even assuming the possibility that these expressions refer to (phenomenologically show), latent and otherwise invisible inner human experience, the problem is that such science can only solve easy Chalmers's problems [Chalmers 1995] and it cannot describe the phenomenal individual experiences of person as person as such. A description of experience „what is it for me“ is only available in a first-person perspective. The problem of *qualia* thus suggests the presence of an epistemic (explanatory) gap [Levin 1983] between the scientific approach from a third person and an introspective approach in terms of an individual.

Many philosophers (so-called „new mysterians“ [Flanagan 1995]) believe that the individual experienced phenomena – *qualia* – are not subjects of scientific study [Nagel 1974]. Others try to find a way to create a science of the subjective [Crick 1995]. Of course, we can

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<sup>5</sup> If the radical constructivists are right, then a) interdisciplinarity is not possible, because we have different objects of enquiry; b) interdisciplinarity is possible, but only to the extent to which we operate with the same core concepts and discourses.



argue whether it is possible to express exactly what the individual is experiencing as an individual and there is no doubt that this particular aspect of experience – its subjectivity – is an important feature of our consciousness. A proponent of the first person argumentation believes that by the elimination of our unique subjectivity, we disregard something significant in our experience, and this „uniqueness” is „inexpressible”. And it is quite possible that in our reasoning we commit contradiction. If it is assumed that *qualia* are not expressible, or that, for example, nobody else can perceive the rose color the way we do, stating this we prove that we leave the position of first person and we „know” what others perceive. How else could we argue that they don't perceive or cannot perceive the way we do, if we „cannot see into their heads”?

It thus appears that in everyday life we do not have the fundamental problem to change optics of the first-person approach to a non-personal perspective. On the contrary, we do so very often. We assume that things will somehow occur, that they are independent of how we uniquely perceive them. If it wasn't so, we probably would not be able to interact with the world. On the other hand, however, we are aware of the hidden introspective layer of thinking and experiencing, inner manifestations and the very subjectivity of “I”. So, are these two approaches compatible? In everyday life they definitely are.

Personally, we believe that one of the essential characteristics of the human mind is the desire for unification and searching for connections. It might be the influence of Kant why we believe that from the architectonics of reason it implies that our minds are trying to conflate knowledge, which arrives from the different ways together with daily life experience. Each of us acts in different situations, roles and contexts but nevertheless we create the unity of ourselves. And this counts also for cases when individual roles may be highly controversial and irreconcilable. And so we may meet believing physicist, moral materialists and introspective exact scientist longing for the harmonization of his scientific and personal attitudes. It seems that the mind is striving for a metalogical interpretation and trying to find the level in which different approaches and conclusions (if they are credible) could be harmonized and understood better on the new (higher or deeper) level. It

thus appears that the mere mind of the investigating individual is inherently interdisciplinary. Interdisciplinarity can be understood as an attempt for openness to a variety of credible and justified interpretations of the world or parts of images, knowing that the positions from which we look at the world are not always entirely compatible. At the same time we are looking for such a place which takes into account access from one perspective, but also all others. In contrast to multidisciplinary, which involves solving the problem using two or more disciplines, interdisciplinary examination does not assume that the problem is solvable only by application of scientific methods. Interdisciplinary assumes the creation of a new center of gravity between several approaches and a whole new perspective of the problem<sup>6</sup>. It believes that it is possible to take a kind of metaposition, which unifies the diversity of views which replenish them and so newly restructures the problem. That is what A. F. Repko has in mind, when in his definition of interdisciplinarity he emphasizes integrity, complexity and deeper understanding of the issue and its relationships [Repko 2008]. We believe that a deeper understanding of the relationships means the emergence of their potential limitations and discrepancies and their understanding as a challenge to overcome them. That is what characterizes the essence of Bohr's complementarity principle. He is aware of the incompatibility of both traditional attitudes and therefore compels us to accept the new, alternative explanation [Heisenberg 1958] which would lead to contradictions if used simultaneously<sup>7</sup>.

Interdisciplinary review may thus provide new insight into the issue, which will not only be a limited sum of disciplinary perspective, but an attempt for a panoramic view of the objects which they newly restructure. It is not only about instrumentalism, or connecting of knowledge (conceptual interdisciplinarity) covering possible dilettantism [Bauer 1990, Fuller 2010], but the critical consideration of appro-

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<sup>6</sup> Repko (referring to Nikitina) indicates the difference between multidisciplinary and interdisciplinarity through the metaphor of a fruit salad and "smoothies" [Repko 2008].

<sup>7</sup> "In transition" stage of his knowledge he recommends to use a mutually exclusive and at the same time complementary class of terms; those that can be used separately depending on the specific conditions [Heisenberg 1958].

aches and also contingent, modal and ontological difficulties [Schleifer 1995] and transformation of the problem to such extent that it actually creates a new field of knowledge producing entirely new knowledge. We believe that the argument of the ontological but especially methodological incompatibility is very serious and should lead the user to a critical and careful combination of methods and conceptual attitudes. On the other hand, it may not yet be unbeatable.

We believe that one of the most important features of interdisciplinarity is that it allows us to see things from different perspectives, but also to realize the afore-mentioned diversity and to try to overcome it by a new transformed point of view. That is how we come to wave-corpuscular theory, but also to understanding of the subjective and objective, private and public (1st person, 3rd person) and we move to new knowledge. And it's all in the hope that the opposite of the external and internal reality (phenomenological and naturalized) is pure illusion. There is only one reality [Delbrück 1986]. The reality of our mind.

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## ZAGADNIENIE INTERDYSCYPLINARNOŚCI (KWESTIE METAFIZYCZNE I METODOLOGICZNE)

### Streszczenie

Autorzy koncentrują się na wybranych metafizycznych i epistemologicznych aspektach nauk kognitywnych, które są typowym przykładem podejścia interdyscyplinarnego w filozofii.

Pierwszym diskutowanym problemem jest kwestia kompatybilności metod. Wielu filozofów uznaje tylko jedną rzeczywistość. Sądzą, że poszczególne dyscypliny naukowe odkrywają pewne aspekty tej rzeczywistości. Używając różnych metod, można uchwycić więcej aspektów tej jedynej rzeczywistości. Ten (platoński) punkt widzenia zakłada, że wszystkie metody badawcze są kompatybilne, ponieważ służą badaniu je-

dynej rzeczywistości. Inni twierdzą, że zasady wyjaśniania i używane metody determinują obiekt badania. Wskazują, że metoda badawcza ma ogromny wpływ na to, co postrzegamy. Metoda może być ujęta w metaforze widzenia: coś ukazuje, a jednocześnie inne aspekty ukrywa. Pojawia się zatem pytanie, czy można łączyć różnorodne metody badawcze, jeśli mogą one ukazywać różne rzeczywistości.

Istotne jest więc pytanie o to, czy obiekt badań jest konstruowany (tworzony), czy odkrywany. Klasyczny punkt widzenia zakłada, że obiekt taki istnieje niezależnie od badań, podczas gdy konstruktywizm twierdzi, że jest on tworzony przez samo badanie. Znaczyłoby to, że różne nauki badają odmienne objekty.

W konsekwencji pojawia się problem pierwszo- i trzecio-osobowego punktu widzenia. Fenomenologia umysłu wymaga podejścia subiektywnego z pierwszoosobowego punktu widzenia, przy użyciu introspekcji i subiektywnych jakości zmysłowych (*qualia*). Podejście naukowe preferuje język obiektywny i badanie mózgu (a nie umysłu), bez możliwości wyjaśnienia *qualiów*. Zatem, czy w ogóle można pokonać trudności pojawiające się ze względu na tę fundamentalną różnicę w sposobie wyjaśniania? Czy istnieje tylko jedna kognitywistyka badająca wszystkie problemy poznania, czy też kwestia poznania jest przedmiotem badań różnych nauk?

**Słowa kluczowe:** interdyscyplinarność, multidyscyplinarność, ontologiczny status obiektów, kompatybilność, komplementarność