ISSN 2227-7242 (Print), ISSN 2304-9685 (Online)
Антропологічні виміри філософських досліджень, 2022, Вип. 22
Anthropological Measurements of Philosophical Research, 2022, NO. 22

UDC 1:316.3.001(001.8:159.923.33)

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Communicative Approach to Determining the Role of Personality in Science

Purpose. This article aims at outlining the socio-communicative prerequisites for the influence of personality on the acquisition of rigorous scientific knowledge. **Theoretical basis.** The communicative foundations of an individual's activity in general and the functioning of his consciousness in particular were laid by the philosophy of Edmund Husserl, primarily due to his introduction of the concepts of "intersubjectivity" and "lifeworld". From these positions, attempts were made to understand the discussion of Karl Popper and Thomas Kuhn regarding the role of the individual in science, in particular, the concept of a "normal scientist" as a participant in the lifeworld of scientists who support special intersubjective norms of reproduction of this lifeworld through scientific communication. The concept of "communicative mind", correlated with the philosophy of Jürgen Habermas, best expresses the rational and argumentative principles of achieving consensus in science. **Originality.** Social anthropology reveals the constitutive significance of teamwork in science as a way of achieving rigorous scientific knowledge. Social phenomenology concretizes this by emphasizing the need for constant improvement of the rules of this communication. The verification of scientific knowledge by facts is strictly determined by the observance of community-recognized scientific tools for achieving such verification, in particular, the conventional agreement within a certain community of scientists regarding the language of science, which is used to describe verification, falsification, and other procedures for organizing scientific knowledge into a system. **Conclusions.** Verification of the obtained scientific knowledge critically depends on the formulation, dissemination and observance of certain institutional rules of scientific communication. This applies, in particular, to the conventionally recognized rules for the verification of scientific knowledge by empirical facts: it is not an isolated scientist who should identify, verify, organize and evaluate empirical facts, but a community of scientists who conduct scientific research in an organized manner. Team scientific work is a special case of collective action, which is characterized by a high level of reflection and application of critical thinking on a communicative basis. In particular, the legitimation of acquired scientific knowledge occurs in the process of scientific research due to the observance of procedural rules and careful work with empirical facts.

Keywords: personality; scientist; scientific communication; communicative mind; teamwork in science; rules of scientific communication

Introduction

The ideal of science is the achievement of adequate knowledge, that is, such knowledge that will retain its truth and self-identity regardless of who is its bearer and how it is used and for what purposes. At the same time, scientific knowledge always has its creator, and despite the existence of the phenomenon of serial scientific discoveries, the personality of the scientist-discoverer is far from accidental every time. In the place of Isaac Newton, any other person could have been under the apple tree and, from being hit on the head with an apple, he would not have had a scientific insight that would have led to the discovery of the law of universal gravitation. Likewise, every person falls asleep every night, but only Dmitri Mendeleev first saw his world-famous periodic table of chemical elements in a dream. Thus, the role of personality in scientific discoveries cannot be overestimated.

But in ordinary everyday scientific work, the personal factor weighs a lot, in particular, what is sometimes called the "human factor". Often the "human factor" means the probability of mistakes, reckless actions, unfortunate accidents. But accidents in science can also be happy ones – it all depends on the attitude: whether to catch an incredibly rare unexpected opportunity or to

doi: https://doi.org/10.15802/ampr.v0i22.271325

miss a long-awaited and foreseen great chance often depends on the personal qualities of the researcher, even the laboratory assistant.

Natural sciences are classically abstracted from the personality of the researcher and the person in general in scientific cognition – they focus on achieving the facts as they are allegedly "by themselves", regardless of the will and sensory abilities of a person. The goal is to identify the connections that are present in the object of research – immutable and essential, which express the very nature of this object, its internal laws and reasons for its functioning and development. It is thanks to this that they claim the status of mathematically "exact", "rigorous" and generally the only ones deserving the name "science". Whereas in the humanitarian sciences, the main methods are interpretation, assumptions and evaluations, which are fundamentally subjective in nature. Some researchers believe that the humanities deserve the status of an art rather than a science in their best examples because they are approximate in their methods and variable in their results: one researcher may well justify an almost the opposite result compared to his colleagues. It seems so at first glance, but how is it really?

At one time, the German philosopher Edmund Husserl put forward a thesis regarding philosophy as the most rigorous science, based on the idea of reducing all the random from the contents of consciousness, including the reduction of the scientist's personality. Instead, the dispute between the British philosopher Karl Popper and the American philosopher and historian of science Thomas Kuhn showed that it is individuals who do science – genius scientists and ordinary researchers. Subsequently, the English physicist and philosopher Michael Polanyi defended the possibility of only personal knowledge in science. However, all these studies lacked consideration of a consistent communicative approach to science and the role of the individual as a participant in scientific communication.

But in fact, it is not about underestimating the personality of a scientist – on the contrary, in recent decades, numerous studies have been carried out at the intersection of philosophy and psychology to identify the conditions under which a scientist's participation in collective scientific work will bring the greatest results (Feist, 2006; Feltz & Cokely, 2012; Havlík, Mladá, Fajnerová, & Horáček, 2018; Miller, 2021). Especially significant is the critical approach to communication in philosophy – James Andow (2022) identifies the need to combine internal, philosophical criticism with external, non-philosophical criticism. Finally, some authors raise the question of the need to clarify the philosophical and anthropological approach to the very phenomenon of man from the standpoint of taking into account the increasingly active participation of man himself in changing his own essence (Honcharenko, 2019).

All these studies, however, still lack a generalizing concept of the significance of the scientist as a person in the implementation of scientific communication to achieve rigorous scientific knowledge.

The research methodology will be social phenomenology, communicative philosophy, applied to the problems of the philosophy of science. Scientific communication appears as a subject of research – when it comes to the norms of scientific communication as criteria for ensuring adequate knowledge, as well as when it is necessary to reveal the institutional significance of scientific knowledge. In both cases, the personality of the scientist is revealed as a participant in scientific communication – primarily due to his ability to be an expert and support teamwork.

Purpose

The purpose of this article is to outline the social and communicative prerequisites for the influence of personality on the acquisition of rigorous scientific knowledge.

doi: https://doi.org/10.15802/ampr.v0i22.271325

A prerequisite for the meaningful development of the topic is the consistent solution of the following tasks: a) Philosophical assessment of individual autonomy and teamwork in scientific research; b) Philosophy of science about the role of the individual in knowing the truth (Kuhn, Popper and Polanyi); c) Intersubjectivity of scientific practices and collective mind in science (Husserl and Habermas).

Statement of basic materials

Philosophical assessment of individual autonomy and teamwork in scientific research

Ukrainian researchers Natalia Kryvtsova and Iryna Donnikova are trying to find a common ground for the natural sciences and humanities by analysing the anthropologization of science. They focus on the autonomy of the researcher's personality – his self-realization, self-transcendence, self-organization on the basis of autopoiesis (Kryvtsova & Donnikova, 2020). At the same time, they ignore the communicative component of scientific research.

Modern English philosopher James Andow summarizes big amount of field studies of the philosophers' ways of thinking and as a result he insists that the features of personality of philosopher could strongly determine philosopher's worldview and could seriously impact of his non-objectivity:

> One thought might be that such perceptions of centrality might skew the trajectory of philosophical enquiry leading to certain objectively important or interesting questions being overlooked or ignored. This could happen in a direct way, through shaping individual researchers' preferences such that they independently choose not to focus their efforts on those questions, or in a more indirect way, through the structure of the profession disincentivising or punishing specialization in particular subfields. (Andow, 2022, p. 11)

But Andow did not propose for researcher to use philosophical communication to avoid such non-objectivity and to join to the collective philosophical reason.

American psychologist in the field of scientific activity Gregory J. Feist (2006) summarized the studies of concomitant factors "behind scientific interest and scientific talent e.g., birth-order and theory acceptance, immigrant status … gender … age" (p. 163). He found out among other that "creative scientists …are generally more open and flexible, driven and ambitious, and although they tend to be relatively asocial, when they do interact with others, they tend to be somewhat prone to arrogance, self-confidence, and hostility" (Feist, 2006, p. 175). And exactly he insist that "the scientific elite also tend to be more aloof, asocial, and introverted than their less creative peers" and "'independence' tended to load on the research factor, whereas 'extraversion' tended to load on the teaching factor" (Feist, 2006, p. 175). Does this mean that social fea-

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tures are not useful for a scientist or that educational practices interfere with scientific work? It seems very contradictory.

On the contrary to this defense of scientific individualism the group of British practical philosophers from the Centre for Nursing and Midwifery Research indicates benefits of teamwork when they compare three different individual philosophies of teamwork with patients: directive, integrative and elective (Freeman, Miller, & Ross, 2000, pp. 240-242). They interpreted the individual strategy not as isolation from other researchers, but as individual decision to choose the special way in teamwork.

Another recent psychologist study, namely the study of personal reasons to accept some position in elaboration of mind-body problem, also hints on the non-productivity of concentration just on intrinsic problems and propose to look outside the shell of personality: "Maybe it is time to move away from the solution of the mind-body problem, and put our efforts into the ideas: why is the mind-body problem such a big problem in the first place?" (Havlík, Mladá, Fajnerová, & Horáček, 2018, p. 8).

In his time, Edmund Husserl was solving the problem of overcoming solipsism in philosophical and scientific knowledge. To do this, he turned to the identification of the intersubjective basis of the activity of consciousness in general and the functioning of scientific cognition in particular (Husserl, 2021). At the same time, he claimed that philosophy is the most rigorous of all possible sciences (Husserl, 1965). Husserl did not clearly indicate the communicative nature of science among the reasons for this rigor; on the contrary, he justified such rigor by referring not to the empirical circumstances of communication, but to pure phenomena. However, Husserl's followers in phenomenology, as well as philosophers of science, all the same in scientific communication sought to find grounds for achieving rigorous knowledge in science and philosophy.

Philosophy of science about the role of the individual in knowing the truth (Kuhn, Popper and Polanyi)

At one time, the dispute between the American historian of science and the author of the philosophical concept of paradigms in science Thomas Kuhn and the British philosopher-epistemologist Karl Popper had a great resonance. In this dispute, Karl Popper (1970) defended the position that the real achievements in science are only scientific discoveries, and accordingly – it is the brilliant scientists who are the personalities in science, on whose decisions often depends the entire future development of science. Instead, Thomas Kuhn (1970) believed that the daily and routine contribution of each scientist is important, that brilliant discoveries require both careful and long-term preparation by the entire community of research scientists, and their further legitimization, numerous and diverse checks by all participants of scientific research: even the laboratory assistant doing routine work is a personality in science: scientific discoveries depend on his accuracy no less than on the brilliant insights of the leading laboratory specialist.

One could agree with Kuhn's argumentation, but there is one significant objection that Popper puts forward: laboratory scientists, exemplified by representatives of natural sciences, tend toward dogmatism:

> A system such as classical mechanics may be 'scientific' to any degree
>
> you like; but those who uphold it dogmatically – believing, perhaps, that

doi: https://doi.org/10.15802/ampr.v0i22.271325

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> it is their business to defend such a successful system against criticism as long as it is not conclusively disproved – are adopting the very reverse of that critical attitude which in my view is the proper one for the scientist. (Popper, 1959, p. 50)

In contrast to them, it is the humanities that have much more opportunities to implement critical thinking of a scientist in practice – the subject of humanities more obviously requires critical perception and verification for the absence of ideological and other value influences. While the subjects of natural sciences are perceived as extra-ideological, but in fact they are based on a latent "world picture", which is analogous to the paradigm in the natural sciences. The "world picture" cannot be empirically verified. Ukrainian researcher Valeriia Honcharenko (2019) argues based on the analysis of the philosophy of Martin Heidegger and Ludwig Wittgenstein: "Understanding the world picture means experiencing it, furthermore, it anticipates not only subjectivity of language-games but also a meta-level of the entirety" (p. 38).

This meta-level is that of metaphysics, not of empirical science.

However, as can be judged from the approach of K. Popper, humanitarians, through the use of critical thinking, are able to make the object of scientific analysis even the provisions of metaphysics, which are subject to the laws of evolutionary epistemology. Thus, it seems to us that Popper (1959) makes the position of the natural sciences to a certain extent the subject of criticism of the humanities: "I equate the rational attitude and the critical attitude. The point is that, whenever we propose a solution to a problem, we ought to try as hard as we can to overthrow our solution, rather than defend it" (p. 16).

Popper expressed this idea long before the controversy with Kuhn:

> It is the most characteristic feature of the scientific method that scientists will do everything they can in order to criticize and test the theory in question. Criticizing and testing go hand in hand: the theory is criticized from very many different standpoints in order to bring out those points which may be vulnerable… (Popper, 1940, p. 404)

Popper categorically opposed Kuhn's thesis about the normal scientist, who is more concerned with testing than criticizing the theory – for Popper it was almost identical work: for Popper the normal scientist

> …has become what may be called an applied scientist, in contradistinction to what I should call a pure scientist. Therefore, it is not surprising that in this point He is, as Kuhn puts it, content to solve 'puzzles'… it is

doi: https://doi.org/10.15802/ampr.v0i22.271325

> not really a fundamental problem which the 'normal' scientist is prepared to tackle: it is, rather, a routine problem, a problem of applying what one has learned… (Popper, 1970, p. 53)

Kuhn's objections gained weight for Popper only when Kuhn pointed out that the rules of scientific communication were important, that is, when Kuhn drew attention to teamwork in science.

Solving puzzles as "trial attempts, whether by the chess player or by the scientist, are trials only of themselves, not of the rules of the game. They are possible only so long as the paradigm itself is taken for granted" (Kuhn, 1996, pp. 144-145).

The emphasis thus shifts from the puzzles themselves to the "rules of the game" in science.

Nevertheless, Popper considered teamwork in science, though important, but secondary – because it always requires restraint in criticism.

> "Normal" science, in Kuhn's sense, exists. It is the activity of the non-revolutionary, or more precisely, not-too-critical professional: of the science student who accepts the ruling dogma of the day; who does not wish to challenge it; and who accepts a new revolutionary theory only if almost everybody else is ready to accept it – if it becomes fashionable by a kind of bandwagon effect. (Popper, 1970, p. 52)

On the other hand, criticism is not only permissible, but also elementary comprehensible for Kuhn's normal scientists, only if they have common scientific beliefs, a common vocabulary of science, avoid non-scientific squabbles, and instead identify really important grounds for scientific discussions: "…because that exploration will ultimately isolate severe trouble spots, they can be confident that the pursuit of normal science will inform them when and where they can most usefully become Popperian critics" (Kuhn, 1970, p. 247).

It is obvious that the dispute between Kuhn and Popper was ultimately not about the appropriateness of teamwork in scientific research, but mainly about the degree of its involvement at various stages of this research. This should be institutionalized in the procedures of scientific work, and the personality in science appears as an expert who carries out constant reflexive criticism of the very foundations of scientific activity and, in particular, participates in improving the rules of scientific communication.

One way or another, the dispute between Popper and Kuhn concerned the basis for scientific consensus, and scientific knowledge itself was perceived as a priori rational and reflexive, explicated and clearly expressed in the language of science (Hattiangadi, 2021). Another shortcoming that Kuhn tried to overcome and Popper barely acknowledged was the emphasis on the individual scientist and the underestimation of team scientific work (Chike, 2021). Popper frankly considered science to be only vivid scientific creativity that results in scientific discovery – and creativity is always a deeply individual matter, in his opinion. Kuhn ostensibly emphasized the im-

doi: https://doi.org/10.15802/ampr.v0i22.271325

portance of the work of scientists in the format of a community of "normal scientists", but thereby belittled collective and team scientific work to the work of laboratory assistants, who appeared to Kuhn as classic experts in solving puzzles. Such was the price of scientific consensus for Kuhn. Both assumed an irrational component in science: Popper in the irrational genius of a true scientist, which cannot be reduced to certain rules and standards, and Kuhn assumed an irrational component in the functioning of the scientific paradigm, when "normal scientists" are more inclined to blindly trust it, rather than criticize the "rules of the game".

To some extent, Ukrainian researchers Kryvtsova and Donnikova are trying to overcome this irrationalism, but they also appeal to the power of reflection of the scientist.

> The researcher plunges into cognitive activity with the whole "set" of opportunities for self-realization, including certain knowledge, skills, personal qualities, abilities, resources, and re-serves, etc., so he is always the subject of his own life and, at the same time, the object of self-reflection, self-actualization, and self-harmonization of originative co-generative co-determinative strengths. (Kryvtsova & Donnikova, 2020, p. 26)

We do not agree with such excessive accentuation of the scientist on his "self".

First, we believe that excessive trust in scientific reflection is erroneous. Not all personal knowledge, as well as not all aspects of interaction with fellow scientists can be exhaustively and successfully reflected. Thus, Michael Polanyi in his work "Personal Knowledge" notes:

> …the aim of a skilful performance is achieved by the observance of a set of rules which are not known as such to the person following them… Rules of art can be useful, but they do not determine the practice of an art; they are maxims which can serve as a guide to the art only if they can be integrated into the practical knowledge of the art. They cannot replace this knowledge. (Polanyi, 1958, p. 20)

Secondly, this in-depth reflexive work of the scientist with his "self" distracts him from building creative relationships with his colleagues in scientific work. Personal knowledge consists not only and not so much in the fact that each scientist consciously develops his own system of knowledge, in some way necessarily different from the system of knowledge of any other scientist, but in the fact that there is always a unique integrity of scientific experience, which can never be fully understood, let alone rationalized. If scientific experience does develop into rational behaviour, it would be more accurate to say that it develops into multiple types of rationality of

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behaviour, that is, into variable ways of rational behaviour of a scientist, and even more so of different scientists. There are always alternative, plural, mutually intertwined rationalities of behaviour in science, which scientists seek to reduce in theory to a single rationality with the help of rigorous thinking.

Thus, there is a problem of organizing the work of a scientist in a team, which only in the final result appears as a teamwork. At the origins of the formation of research teams is the fundamental possibility of the functioning of the collective scientific mind.

Intersubjectivity of scientific practices and collective mind in science (Husserl and Habermas)

The collective mind has the phenomenon of intersubjectivity as its framework premise: it is the actual existence of a common experience of interaction between people that creates the possibility of understanding between them – both at the everyday, empirical, and conceptual, theoretical level.

In his time, Edmund Husserl (2009) drew attention to the importance of those pre-reflective operations of consciousness, which he generally called "pre-predicative experience". Based on the fundamental nature of this experience and its decisive influence on all other operations of consciousness, Husserl (2021) gave priority to the phenomenon of intersubjectivity and the life-world generated by it, but did not properly develop this theory.

To some extent, this task was fulfilled, although not on the basis of phenomenology, but on the basis of common sense philosophy, by the British philosopher George Moore, who gave a classic definition of the probability of coexistence of participants in the world of common sense:

> Finally (to come to a different class of propositions), I am a human being, and I have, at different times since my body was born, had many different experiences, of each of many different kinds: e.g. I have often perceived both my own body and other things which formed part of its environment, including other human bodies […] so, in the case of very many of the other human bodies which have lived upon the earth, each has been the body of a different human being, who has, during the lifetime of that body, had many different experiences of each of these (and other) different kinds. (Moore, 1959, p. 33)

This definition illustrated the problem: from the experience of one person it is impossible to obtain sufficiently reliable for science experience of the community to which this person belongs, but only to some extent reliable.

Husserl could not solve this problem as well. In the early period, he tried to solve it in ways close to the apriorism of Immanuel Kant – when Husserl asserted the rigor of philosophical

doi: https://doi.org/10.15802/ampr.v0i22.271325

knowledge as necessary even before any individual experience. After all, if natural knowledge can be based only on empirical experience, which is inevitably changeable and therefore unreliable, then only philosophical knowledge appears as absolutely rigorous: "And even if spiritual formations can in truth be considered and judged from the standpoint of such contraries of validity, still the scientific decision regarding validity itself and regarding its ideal normative principles is in no way the affair of empirical science" (Husserl, 1965, p. 126).

However, although the source of these ideal normative principles is pure consciousness, the way to its acquisition lies for the scientist through the sharpening of his own cognitive competencies in scientific discourse. For Husserl, this was not yet obvious – he appealed more to the world of intersubjectivity and the lifeworld as a pre-reflective common experience of the participants of this world.

The well-known modern German philosopher Jürgen Habermas approaches the identification of the normative principles of science with more emphasis on the conditions for achieving an effective scientific discourse. In an interview devoted to the topic of communicative mind, Habermas noted: "With the idea of decentralizing socialization, historicizing and embodying the transcendental subject in the lifeworld, we transfer transcendental spontaneity into a circular process that is no longer centred in the subject itself" (transl. by O. K.) (Habermas, Demmerling, & Krüger, 2016, p. 814).

This circle is a circle of communication, where what matters is not individual subjects, but collectively reached rationally reasoned agreement.

When Habermas speaks about the mutual dependence of the lifeworld and communication of the participants of this lifeworld with each other, his thesis sounds most convincingly in relation to scientific communication and scientific lifeworld.

> On the one hand, communicatively acting subjects feed on the "achievements" of the lifeworld, traditions, social relations and their own competencies, trying to "cope" with the objective world and with each other. On the other hand, the lifeworld can survive only through the communicative actions of actors who deal with their natural and social environment through creative exploration of the world and problem solving. (transl. by O. K.) (Habermas, Demmerling, & Krüger, 2016, p. 814)

Obviously, it is this circle of mutual dependence of the collective on the individuals that Habermas has in mind when he talks about overcoming the focus on the subject.

Originality

All this emphasizes the need to shift the focus from the very rules of scientific communication and the scientist as the subject of his own research to the collective, teamwork of all scientists on the examination, clarification and improvement of the rules of scientific communication.

doi: https://doi.org/10.15802/ampr.v0i22.271325

This is the general conclusion that can be drawn based on Habermas' approach: the first subject of discourse is always the very rules of conducting discourse. When applied to the field of science, this means directing scientific creativity to the rules of scientific communication – then the collective mind of the entire scientific community, rather than autonomous scientists, begins to create. This brings the philosophical phenomenological research to the level of social anthropology, which reveals the social prerequisites for the formation of not only human consciousness, but also the human being as a whole. A striking example of the validity of this statement is the observance of the rules of functioning of scientometric databases, which creates an institutional effect of teamwork – even between those scientists who have not previously known each other personally and began to work on a common problem precisely because of the acquaintance with each other's properly published research. Achieving rigorous scientific knowledge is possible only within the framework of a system of scientific knowledge, and such a system itself can be created, reproduced and developed only by a system of rationally ordered and institutionally organized scientific communication. Teamwork of scientists can be successful only if the fundamental socio-anthropological characteristics of the functioning of communities of scientists, as well as the socio-phenomenological characteristics of the functioning of the scientist's consciousness, are adequately taken into account.

Conclusions

The rigor of the obtained scientific knowledge is increasingly determined by the accuracy of compliance with certain institutional rules of scientific communication, and not only by the availability of sufficient quantity and quality of verification of scientific knowledge by empirical facts. Properly established teamwork in science makes it possible to identify, verify, organize and evaluate empirical facts faster and more efficiently. On this communicative basis of scientific research, there is an effect when the legitimation of the obtained scientific knowledge occurs not before the beginning of scientific research (as in Kuhn's "normal science"), and not after its implementation (as in Popper's theory of scientific discovery), but during the research itself. This greatly increases the role of each participant in scientific communication, if he works as a member of a scientific team at all stages of scientific research, and not as a lone researcher. In science, aimed at constant self-improvement of the rules of scientific communication, the activity of each scientist as an individual also arises and reaches a high degree of perfection.

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Комунікативний підхід до визначення ролі особистості в науці

Мета. У цій статті автор передбачає окреслити соціально-комунікативні передумови впливу особистості на отримання строгого наукового знання. **Теоретичний базис.** Комунікативні засади діяльності особистості загалом і функціонування її свідомості зокрема було закладено філософією Едмунда Гуссерля, передусім завдяки введенню ним понять "інтерсуб'єктивність" і "життєвий світ". Із цих позицій здійснено спроби осмислити дискусію Карла Поппера й Томаса Куна щодо ролі особистості в науці, зокрема, поняття "нормального вченого" як учасника життєвого світу науковців, які підтримують особливі інтерсуб'єктивні норми відтворення цього життєвого світу завдяки науковій комунікації. Поняття "комунікативного розуму", корельоване з філософією Юргена Габермаса, якнайкраще виражає раціонально-аргументативні засади досягнення консенсусу в науці. **Наукова новизна.** Соціальна антропологія розкриває конститутивну значущість командної роботи в науці як способу досягнення строгого наукового знання. Соціальна феноменологія конкретизує це, акцентуючи на необхідності постійного вдосконалення правил здійснення цієї комунікації. Верифікація наукових знань фактами жорстко детермінована дотриманням визнаних спільнотою вчених інструментів досягнення такої верифікації, зокрема – конвенційної згоди всередині певної спільноти вчених щодо мови науки, за допомогою якої здійснюють опис верифікації, фальсифікації та інших процедур упорядкування наукових знань у систему. **Висновки.** Верифікація отриманого наукового знання критично залежить від формулювання, поширення й дотримання певних інституційних правил наукової комунікації. Це стосується, зокрема, конвенційно визнаних правил верифікації наукових знань емпіричними фактами: виявляти, перевіряти, упорядковувати та оцінювати емпіричні факти має не ізольований учений, а спільнота вчених, які організовано виконують наукові дослідження. Командна наукова робота є особливим випадком колективної дії, яку вирізняє високий рівень рефлексії й застосування критичного розуму на комунікативних засадах. Зокрема, легітимація отриманих наукових знань відбувається в процесі здійснення наукового дослідження завдяки дотриманню процедурних правил і ретельній роботі з емпіричними фактами.

doi: https://doi.org/10.15802/ampr.v0i22.271325

Ключові слова: особистість; науковець; наукова комунікація; комунікативний розум; командна робота в науці; правила наукової комунікації

Received: 23.05.2022
Accepted: 15.12.2022

doi: https://doi.org/10.15802/ampr.v0i22.271325