

V International Forum on Teacher Education

The Methodological Aspects of the Research-Based Teacher Education

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Abstract

The aim of the study is to analyze the methodological bases for the development of students' research skills in pedagogical education. The importance of this analysis is determined by the fact that many graduates of pedagogical universities perceive scientific activity as the study and compilation of other people's ideas. The formation of students' research skills is impossible without understanding that scientific knowledge is a special and unique in many ways form of cognitive activity, which is based on the methodological rules of science and cannot be replaced by any other. The effectiveness of students' research practice is determined to a significant extent by the understanding that none of the questions the answers to which can be found within the existing body of scientific knowledge or in the process of everyday knowledge is a scientific problem. Since the ideality of all humanities, including pedagogical, research objects makes it impossible to use the methods of natural sciences in the study of these objects, it is necessary to develop not only students' ability to carry out empirical research of material products of culture and material aspects of human activity, but also to form the methodological basis for the study of the ideal content of these products and activities. The specificity of pedagogical research is that the practical use of their results is included in the complex process of interaction of social beings with consciousness, will and unique individual features, which any theoretical model cannot take into account and explain.

Keywords: science; scientific problem; humanities knowledge; research-based practice; teacher education.

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Published by Kazan Federal University and peer-reviewed under responsibility of IFTE-2019 (V International Forum on Teacher Education)

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Introduction

As a result of pure formal reproduction of the attributes of scientific texts without a sufficiently clear understanding of the essence of scientific research and the humanities research, in particular, many graduates of pedagogical universities perceive scientific activity as the study and compilation of other people's ideas. Since the activity of teachers and supervisors is not an effective obstacle to the spread of this delusion, it is obvious that there are problems in the process of research training of graduates of pedagogical universities caused not by individual characteristics of students and teachers only, but by the organization of students' research practice and the methodological foundation on which it is based (Motovilov, 2016; Musina, 2016).

It should be noticed that science as a form of knowledge and science as a social institution has different features and regularities of development which express two sides of science as a socio-cultural phenomenon and do not coincide with each other. Moreover, there is a contradiction between the forms of scientific research as a process of knowledge and the forms of social organization of science that does not contribute to the successful development of the research-based teacher education.

Social organization of science and education can exist only on the basis of well-defined rules and regulations governing the activities of all who participates in the learning process of young researchers. Plans, schedules, deadlines, exams are necessary elements of the social organization of the educational process, as the society (represented by the administration of a university and relevant departments) has the right to demand evidence of students' research activity (Orlova, 2017).

Many novice researchers pay attention not to a scientific research, but to the forms of social organization and symbolic aspects of scientific activity, precisely because the final formulation of the topic and the exact plan of its study are required from them first of all. Meanwhile, if at the very beginning of the study a student already knows not only the essence of the problem, but also the ways of solving it to such an extent that he/she is able to present both the content of her/his work on the chapters and paragraphs and the timing of writing the text by years and months, what, in this case, he/she is going to research?

The real possibility to regulate any activity in that part of it which is associated with the creation of a new result is extremely small. In fact, social forms of organization of science and training of young researchers come into an objective contradiction with the essence of research activity, which rarely begins with the exact formulation of the topic and never fit into pre-made plans.

Overcoming the pernicious misconception of a scientific article or dissertation as mere compilation drawn up in accordance with certain rules requires special attention to the explanation of the nature of scientific research activity, especially the features of humanities knowledge, the field of which pedagogical research belong to.

Methodology

The research is based on the modern concept of science as the form of knowledge and the phenomenon of culture. In the process of studying the research-based teacher education pedagogical experience and the methods of content and logical analysis, interpretation, comparison, generalization and theoretical deduction were used.

Results

The essence of scientific knowledge

The question of the specifics of scientific knowledge and the reasons for its occurrence in the history of mankind remains the most difficult to understand and the most important for the entire process of studying science as a cultural phenomenon (Feyerabend, 1988, 1999; Kuhn, 1970). Neither the rapid

development of science itself, nor the increase in the level of digitalization of the educational environment lead automatically to the growth of the authority of science in the public consciousness or to the understanding of the essence of scientific knowledge of the world (Chernyakova, 2015). One of the stable illusions of social consciousness continues to be the idea that mankind could get the knowledge obtained by science without any science, that the laws of nature and society could be discovered in the process of everyday practice.

Meanwhile, if the essence and regularities of the development of natural and social phenomena could be discovered in the processes of labor, household, magical, artistic, religious, political or any other kind of human activity, then science as a special kind of knowledge would be superfluous. However, no set of non-scientific knowledge could reflect those aspects of reality, the knowledge of which is obtained in the process of scientific research, because there are such levels of essence and such regularities of development of the phenomena of reality, which cannot be known without the use of special tools and methods (Gajdenko, 1980, 1987).

From the moment of the first purposeful observations of astronomical objects and phenomena of the surrounding nature and up to the modern highly complex experiments science continuously moved on the way of creating a special scientific basis of its existence and development. Practical interaction with the studied object in the process of controlled observation and experiment has become not just one of the methods, but an expression of the very essence of the scientific method of cognition and its fundamental difference from all the other types of cognitive activity.

Scientific knowledge aims at the study of natural processes independent of the will and consciousness of man as a subject of history; is based on special practical activities – observation and experiment; forms an empirical basis, the content of which can be interpreted independently of the accepted hypotheses; creates theoretical models which reveal the essence of studied objects at the level of quantitative laws and make it possible to predict a new empirical data (Bazhenov, 1978; Ruzavin, 1978).

All elements of science as the form of knowledge have properties that ensure the achievement of the main goal of scientific knowledge – intersubjective knowledge of the essence and laws of the natural phenomena. To achieve this goal, scientists research special objects that do not coincide with the objects of ordinary practical and cognitive activity; create special methods and means of their studies; develop special procedures for verification of the obtained results; continuously improve the entire system of scientific knowledge, including scientific facts, hypotheses and theories, empirical and theoretical validity of which does not remain unchanged in the development of scientific knowledge; develop special scientific ways of presentation, discussion, storage, inheritance of scientific knowledge teaching a new generation of scientists.

The main function of science as a system of social institutions is to organize and to serve the production and transmission of scientific knowledge, as well as the reproduction of scientific personnel and the exchange of activities between science and other branches of social production.

So the ultimate objective of science is to achieve intersubjective scientific knowledge, revealing the essence and laws of reality on the basis of a special practical interaction with the studied objects of nature and society. This ultimate objective is manifested in each scientific study, the main goal of which is to obtain new knowledge about certain phenomena of reality. Nothing that is already known can be the object of scientific research aimed primarily at the knowledge of the unknown and only in the second place – at studying, assimilation, and storage already acquired knowledge. That is why the most important feature of scientific activity is its focus on solving scientific problems.

The role of scientific problems

Scientific research exists only where and when scientific problems are posed and solved. This is explained by the fact that a scientific problem is the only form of knowledge, in which the object of study appears before researchers as unknown (Lakatos & Musgrave, 1970). It is just because of this specific difference of the problem from any other form of perception of the studied object that the scientific problem is called “knowledge about ignorance”.

Since the presence of a problem field in which there is at least one problem is an integral feature of any scientific research, it is no exaggeration to say that if there are no any scientific problems, there is no scientific research at all. And conversely, the perception of the studied object in the form of a problem determines the novelty of the result obtained in the process of scientific research, since the solution of any scientific problem carries a new knowledge about the research object.

A scientific problem is always a result of conscious, purposeful research activity of a scientist, and as a form of knowledge it can exist only in the consciousness of the actor of scientific knowledge who is aware of the problem. However, necessary prerequisites for the emergence of a scientific problem exist objectively in the system of scientific knowledge and in this sense do not depend on the consciousness or creative abilities of a scientist.

It is really important that at the very beginning of his/her own research practice each student realizes that scientific problem cannot be imagined or invented. The birth of a scientific problem in the minds of both venerable scientists and students is determined by the depth of comprehension of the available system of knowledge, the level of understanding of not imaginary, but the real limits, problems and possible points of growth of this system.

Any scientist cannot change the content of the system of knowledge that already exists in a certain scientific discipline, until he/she knows the essential elements of this system (its basic principles, fundamental theories, empirical data, methods and means of research, etc.) and understands why some of these elements need to be changed. Only a deep level of penetration into the theoretical and methodological specifics of the scientific discipline provides a scientist with an opportunity to realize the current “problem situation”, which forms together with the scientific problems formulated by other scientists the problem field of this scientific discipline.

It is necessary to pay special attention of students to the fact that attempts to classify scientific problems on important and unimportant, essential and insignificant, correct and wrong, perspective and unpromising are based, as a rule, on various criteria following from different concepts of the investigated objects. Thus, the problems which in the framework of some scientific directions, schools, systems of ideas are considered as irrelevant, unimportant and even incorrect, in the framework of others or newly emerging areas are proved to be correct, important, significant, perspective, etc.

In the process of discussions about the influence of socio-cultural factors of the development of scientific knowledge is especially obvious and should be taken into account. Anyway, the last word always rests with a researcher himself or herself, who is aware of the importance and prospects of the scientific problem formulated by him or her. It can be mentioned that the ability to perceive the problem field of the chosen branch of science is a sure sign of professionalism, and the ability to formulate new scientific problems is a proof of a truly scientific nature of cognitive activity.

The specifics of humanities problems

To understand the specifics of humanities knowledge, it is necessary to proceed from the fact that all socio-cultural objects are the unity of two sides: the material one, existing in the natural world and

sensually perceived, and the ideal one, existing in the spiritual world of the subject of culture and sensually not perceived (Rakitov, 1982).

The peculiarity of humanities knowledge is that it is aimed at the study of the ideal side of social objects, namely: goals, meanings, values, beliefs, and other ideal entities included in the structure of culture as a specific way of life of a particular subject (Ivanov, Korshunov, & Petrov, 1981).

The means of humanities research are not scientific instruments or installations, but interpretations of different cultural products considered as the embodiment of goals, meanings, value orientations and other ideal phenomena that characterize the spiritual world of a cultural subject. The content of ideal phenomena appears in humanities studies only as a result of interpretation, as an understanding of the meaning enclosed in a material shell. Therefore, it is just an interpretation of material media and forms of embodiment of the ideal content of subjective reality that is the actual humanities method of cognition.

The humanities interpretation of some products of culture or of some culture as a whole way of life can be: logically consistent - if the author's reasoning does not violate the laws of logic, consistent with each other and follows from a number of basic principles; original - if it allows revealing previously unknown meaning, to rethink the products of culture; heuristic - if it opens a possibility of further identification of meanings. But it cannot be true or false, because no interpretation of the ideal content of socio-cultural phenomenon can be refuted.

The arguments about the "a set of truths" lose their absurdity only in the humanities knowledge, the objects of which do not have one meaning and cannot be displayed in one "true" interpretation.

Discussions

Speaking about the significant limitation of the role of experiment or the need for "disguised" experimentation in the humanities and social sciences, humanities experts rarely question the very possibility of using the experimental method in the study of the actual humanities aspects of human life. On the contrary, it is considered acceptable to introduce the term "quasi-experimentation", which denotes the ways of studying objects that have nothing to do with the essence of the experiment, namely: the study of statistical data, comparison, retrospective study of occurred events, and even surveys and questionnaires.

What is called "experiment" in the pedagogical literature is actually a description of a single (carried out in one school, class or group of students) teaching experience in the application of a particular method of conducting lessons, lectures, tutorials or extracurricular activities (Kharlamov, 2007; Perminova, 2013). In contrast to the authentic experiment result, the result of any teaching experience is known in advance. Anyhow, a proposed methodology of teaching or a training technique would be suitable for some learners and unsuitable for others. At the same time, a principle of maximum possible individualization of the approach to each learner in the process of training and education prescribes teachers to use any technique if there is at least one person to whom it is suitable (Kovaleva, 2013; Seliverstova, 2013).

Pedagogical knowledge as a kind of humanities knowledge is based on the wide socio-cultural experience of mankind and centuries-old practice of teaching and education, but not on the experimental practice, because the ideal content of thoughts and cultural products resides only in subjective reality and cannot be studied in the process of experimental activity (Chernyakova, 2013).

Undoubtedly, any material medium of ideal content, from texts and technical devices to a human body, exists in the same physical space as natural objects and is ruled by the same laws of nature. All branches of social and humanities knowledge apply scientific methods of observation, description, measurement, mathematical modeling etc. studying the material media of the ideal content (Martynovich, 1983). However, empirical data obtained by pedagogical knowledge on the basis of experimental practice

and related to the material media and forms of embodiment of ideal content do not express the specifics of cultural products and human behavior as the results of conscious human activity.

In contrast to scientific research, in the process of which there is a direct sensory contact with the studied object, humanities research is aimed at identifying and investigating what is not given in a direct sensory perception. Ideal objects are given to researchers only indirectly in the material forms of their embodiment. The ideal content of socio-cultural phenomena does not have space-temporal characteristics that can be observed and does not possess such properties that could be studied in a practical way by scientific methods of observation, measurement or experiment.

The humanities research is always theoretical and hypothetical, because all the empirical data used in a study refer not to the ideal content of socio-cultural objects, but to the material media of the ideal content only. These data cannot serve as a confirmation or refutation of the alleged meanings or motives of human activity the pure mental modeling of which is carried out with the help of abstract objects (Shvyrev, 1978).

Conclusion

The formation of students' research skills is impossible without understanding that scientific knowledge is a special and in many ways unique form of cognitive activity, which is based on the methodological rules of science and cannot be replaced by any other.

The fundamental basis of students' research practice should be the understanding that science is a socially organized process of gaining knowledge about those aspects of the essence and laws of reality, which cannot be got in any other forms of material or spiritual activity of mankind.

The effectiveness of students' research practice is determined to a significant extent by the understanding that none of the questions, the answers to which can be found within the existing body of scientific knowledge or in the process of everyday knowledge, is a scientific problem.

The ideality of all humanities, including pedagogical, research objects makes it impossible to use the methods of natural sciences in the study of these objects.

In the process of research-based practice of students of pedagogical universities it is necessary not only to develop the skills of empirical research of material products of culture and material aspects of human activity, but also to form the methodological basis for the study of the ideal content of these products and activities.

The specificity of pedagogical research is that the practical use of their results is included in the complex process of interaction of social beings with consciousness, will and unique individual features, which any theoretical model cannot take into account and explain.

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