

Searching for logically and contensively incomplete components of pedagogical theory and practice

Búsqueda lógica y contemporánea de componentes incompletos de teoría y práctica pedagógica

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ABSTRACT:

Introduction: for pedagogical science to "move" in the direction of the "gnoseological ideal" it is necessary to systematize theoretical and practical results obtained by different researchers and, in particular, to determine those actual fragments, the development of which has not yet been logically and contensively completed. Materials and methods: the methodological background of the article has been the analysis of the content and logic of domestic and foreign philosophical and pedagogical studies; the analysis of the results evident in practical educational training; the analysis of special features of the main methodological principles' manifestation in specific studies, in particular, those that have high practical significance; heuristic synthesis; statement of the hypothesis, its theoretical substantiation; generalization of conclusions reached, reflection of the research result. Research results: special attention is paid to the identification of those aspects of pedagogical knowledge that are either contensively or logically not completed. Also, the principle of symmetry in the methodology of pedagogical research is emphasized. A three-component classification of

RESUMEN:

Introducción: para que la ciencia pedagógica se "mueva" en la dirección del "ideal gnoseológico", es necesario sistematizar los resultados teóricos y prácticos obtenidos por diferentes investigadores y, en particular, determinar los fragmentos reales, cuyo desarrollo aún no ha sido realizado. Lógicamente y contensivamente completado. Materiales y métodos: el trasfondo metodológico del artículo ha sido el análisis del contenido y la lógica de los estudios filosóficos y pedagógicos nacionales y extranjeros; el análisis de los resultados evidente en la formación educativa práctica; el análisis de las características especiales de la manifestación de los principales principios metodológicos en estudios específicos, en particular, aquellos que tienen una gran importancia práctica; síntesis heurística; enunciado de la hipótesis, su fundamentación teórica; generalización de las conclusiones alcanzadas, reflejo del resultado de la investigación. Resultados de la investigación: se presta especial atención a la identificación de aquellos aspectos del conocimiento pedagógico que se contestan o no se completan lógicamente. Además, se enfatiza el principio de simetría en la metodología de

search "mechanisms" is offered, substantiated and illustrated with examples, which can be used by pedagogues to identify actual fragments of pedagogical knowledge requiring contentive and logical completion. It can be used as a methodological reference by authors choosing a subject for their pedagogical research. Discussion and conclusions: the main conclusion is that the general scientific pattern "the growth of knowledge volume causes a correlated growth of "ignorance" volume" is confirmed by an analysis of the development of pedagogical science; the process of identifying undeveloped pedagogical fragments can possibly be "structured and classified".

Keywords: "knowledge of ignorance", completeness of pedagogical research, methodology of pedagogy, symmetry principle, composition and decomposition, students' independent work.

la investigación pedagógica. Se ofrece una clasificación de tres componentes de "mecanismos" de búsqueda, probados e ilustrados con ejemplos, que pueden ser utilizados por los pedagogos para identificar fragmentos reales de conocimiento pedagógico que requieren una conclusión contentiva y lógica. Puede ser utilizado como una referencia metodológica por los autores que eligen un tema para su investigación pedagógica. Discusión y conclusiones: la conclusión principal es que el patrón científico general "el crecimiento del volumen de conocimiento causa un crecimiento correlacionado del volumen de" ignorancia "se confirma mediante un análisis del desarrollo de la ciencia pedagógica; el proceso de identificación de fragmentos pedagógicos no desarrollados puede posiblemente "estructurarse y clasificarse".

Palabras clave: "conocimiento de la ignorancia", exhaustividad de la investigación pedagógica, metodología de la pedagogía, principio de simetría, composición y descomposición, trabajo independiente de los estudiantes.

1. Introduction

According to science theorists and methodologists of scientific research, modern pedagogical science remains predominantly descriptive and refers to a low epistemological version. One of the main reasons causing this situation is the

absence of unequivocal and generally accepted definitions of basic pedagogical concepts (the problem of multiplicity), therefore one term can cover several essential positions, versions of the concept of the phenomenon being studied. A typical example that can be given here is problem-based learning that has been intensively developed in the Russian didactics since the 1980s. At present, several versions of this methodical system are known, each containing a definition of the system, its structure and functions, a description from the perspective of common didactics and methodology. Such versions include research by I. Y. Lerner, M.N. Skatkin, T. V. Kudryavtsev, A. V. Brushlinsky, V. Okon, M. I. Makhmutov and several other well-known scientist-pedagogues and psychologists. Consequently, a modern author studying this methodical system should, when giving his/her own definition, make reference to the version he relies on and point out what key provisions of the predecessors he develops.

Multiplicity is not the only epistemological problem of pedagogy. We consider other problems to be the vagueness of logical procedures and operations applied in pedagogical research, the undeveloped features of the application of mathematical methods in analyzing the results of pedagogical experiment, and a small number of studies devoted to the systematics of the results obtained in pedagogy. The latter should include knowledge of the elaboration degree of different fields in pedagogy on the one hand, and on the other hand, the so-called "knowledge of ignorance" (a systematized presentation of those fragments that are not sufficiently developed or not developed at all). This is important for starting investigators as to correctly identify their field of research for the future.

With reference to the above mentioned the purpose of this article is: 1) substantiation of the essential possibility to structure and classify the process of searching for contentively and practically unfinished fragments of pedagogical knowledge; 2) search for a specific classification of ways to identify insufficiently developed components of pedagogical knowledge; 3) analysis of its completeness degree as a reference point for subsequent research.

2. Literature review

The problem of "white spots" in the national pedagogical science is investigated mainly within methodology of pedagogy and in theoretical pedagogy. Among the most interesting national works in this sphere are books and articles by A.M. Novikov, particularly, one of his

most recent works "Foundations of Pedagogy". The author brings forward and substantiates such aspects of the problems described by him and fragments of pedagogical knowledge that contain certain contradictions or need further development.

In carrying out theoretical generalizations and classifying methods for identifying the "white spots" of pedagogical science we also used literature which describes in a systemized way problems of pedagogy and pedagogical psychology related to the activity control of the educational cognition subject (works by V.A. Krutetskii, A.V. Petrovsky (2000), V.V. Davydov (2003)).

The analysis of several basic concepts of pedagogy, outlined in the main text of our article, was carried out on the basis of the results presented in L.A. Mikeskina's "Dialogue of Cognitive Practices" (Mikeskina 2016), as well as in articles and books by foreign authors: P. Feyerabend, M. Finley, S. Hempel, J. Holton, T. Kuhn. These studies are devoted to general problems of obtaining scientific knowledge, the problem of scientific truth and the formation of abstract concepts in social and humanitarian knowledge.

For example, P. Feyerabend investigated general and particular methods of scientific cognition in social and humanitarian sciences, ways of forming new abstract concepts in the system of socio-humanistic knowledge at the present stage of its development (Feyerabend 1975). M. Finley revealed the peculiarities of the postnonclassical development of the methodology of humanities, substantiated the thesis that the more information is accumulated in a "hidden" form, the more "knowledge of ignorance" is accumulated as well - the layer of knowledge that summarizes and classifies the main and particular problems of different specific fields of science.

The author also reveals the reasons for their non-disclosure, outlines the prospects for their solution (Finley 2015).

S. Hempel in his work presents the problem of truth of modern socio-humanistic knowledge in the dialectical correlation of relative and absolute truth, trying to find the connection between the known and unknown (Hempel 1965). J. Holton analyzes the problem of the connection of new social and humanitarian concepts with those phenomena and processes that these concepts denote (Holton 1988). T. Kuhn considers the functions of "dogma" in social and humanitarian knowledge and the process of "obtaining" it, examines the processes of obsolescence of socio-humanistic knowledge elements, specifying the term "scientific novelty" in relation to this field (Kuhn 1963).

In the course of our investigation, we have also used the results obtained by foreign philosophers and methodologists of science in the content-related space we have chosen for over the past five years. For example, G. Gardner considers the problem of scientific cognition boundaries, illustrating the thesis "horizons of truth" as a gradually expanding space of scientific knowledge that does not have any limits. Nevertheless, the author provides this thesis with in-depth speculations about "where science ends", including into the reasoning the correlation of scientific and trivial cognition, as well as what is connected with the obsolescence of once-obtained scientific knowledge. The analysis demonstrates how the scientific community gradually realizes the limitations of the theories that once claimed to be absolute truth and implements the widely known today correspondence principle discovered by the physicist N. Bohr (Gardiner 2015).

The study of the boundaries of scientific cognition is also contained in the article written by the methodologist of social cognition D. Prichardt (2013). He analyzes general problems characteristic of the modern post-nonclassical stage of the development of science, at which one of the problematic and ambiguous tendencies is the convergence of natural-scientific and humanitarian approaches to describing the world around, including the attempts to present humanitarian knowledge on an axiomatic basis, on the one hand, and to identify the components of natural science humanitarization process - on the other hand. Particularly (and this is very important for our research), the problem of "completeness" of humanities is pointed out which, according to the author, means a widely held opinion about the exhaustiveness of the humanitarian description of the world, the impossibility to realize the criterion of scientific and practical novelty in humanitarian discoveries.

The same problems are also touched upon in the article by J. His, devoted to the idea of a retrospective- historical analysis of humanities, briefly expressed in the thesis "humanitarian knowledge in the mirror of philosophical reflection" (Heath 2015). The author also analyzes the problem of the exhaustion of the "development resource" by humanitarian knowledge, basing on an unprecedented increase of information volume in humanities over the past thirty years. We have tried to refute this thesis in our article in the subsequent presentation. The problems of methodologically oriented critical comprehension of the content and logic of social knowledge in the context of correlating the research experience and the interpretation of the information obtained from multiple databases are discussed in the works by D. Laidi (2015) and K. Kony (2014).

While working with foreign scientific sources, we became particularly interested in the problem of the language of educational sciences, discussed by B. Kotsee (2013). Among the many issues those that are related to the formation of new concepts in "educational" knowledge appeared relevant to us. This process, according to the author, reflects the trend of integration of educology (one of the sciences about education) with philosophy and methodology of social cognition, as well as with modern sciences connected with information technology in one way or another.

The analysis of modern studies shows that, despite the significance of the results obtained, the problem of classifying elements that could become the basis of the content field of the "knowledge of ignorance" segment is practically not investigated by authors. Also in the scientific sources that have been examined, the topic of searching for a content field for studies that have potential novelty is practically not projected on the problems of modern pedagogy and education. Basically they are about sociology, philosophy of cognition and very superficially about psychology, which allows us to claim the relevance of the theme in the title of the article.

Describing the attempt to classify ways of identifying "white spots" in pedagogical science, the authors of the article relied on the system of methods of pedagogical research presented in detail in the works by the major methodologist of domestic pedagogy V. V. Kraevsky (2009).

To sum up our brief review of literature, we can say that the information about actual and insufficiently investigated problems of pedagogy is not presented in a holistic, systematized form. The sources are dominated by a narrow-scale consideration of this problem, rigidly tied to specific content fragments of education theory and practice.

3. Materials and methods

In the course of our theoretical research, the method of analyzing the literary sources of the content field of philosophy and the methodology of science was used, within which the problem of "white spots" in pedagogy is "located". In order to completely cover the scientific level and the degree of the previous problem elaboration, we turned to books and articles by both domestic and foreign authors containing a full, systematic presentation of our problem. Specific mention is to be made of the analysis of classical psychological literature related to the problems of managing the educational activity of schoolchildren and students.

One more method of work was heuristic synthesis, which allowed to formulate a thesis about the inadequacy of elaboration of the theme stated in the title (for reasons mentioned above) and to put forward the hypothesis that a classification scheme of ways to identify "white spots" is basically possible. One of its variants contains the following components expressed in the form of theses:

- 1) documentation of the development degree of any pedagogical technology for one age segment and poor development degree for another one, despite its relevance for the second age;
- 2) the component based on the principle of symmetry, suggesting that if some "direct" connection between pedagogical phenomena and processes is developed, then it is reasonable to develop a symmetric "reverse" connection;
- 3) the component based on the principle of completeness of some classification, suggesting

that if some pedagogical field is classified (in accordance with all the rules) into segments (some of which are developed, and some are not or are substantially weaker), then it is quite a reasonable desire for the researcher-methodologist to develop all the selected segments.

In the course of the research, the method of result reflection was used, which shows that the above classification itself is not complete today and requires further study.

4. Research results

The phrase "knowledge of ignorance" is now often used by general scientific and specific scientific methodology. With reference to pedagogy, it includes information on the "white spots" of pedagogical science, its contensively and logically incomplete fragments. All of them can be expressed by one or another "verbal formula".

We refer to the first type of fragments those which are not developed enough from the point of view of practical actuality, as far as certain knowledge, skills, strategies of activity, personality traits, mental processes of students are concerned on the one hand, and the lack of relevant scientific and pedagogical knowledge on the other. In a number of cases this can be expressed by the "formula": some fragment of pedagogy is developed in detail for students of one age, but almost not developed for students of another age, and this development could contribute to the formation of positively valuable personal qualities and cognitive strategies.

Let us consider an example from the book by A.M. Novikov "Foundations of Pedagogy". The author points out that in modern pedagogy the problem of the formation of students' mental processes is not sufficiently developed. In addition, the scientist underlines that traditionally (in the Soviet period) pedagogy was addressed to schoolchildren and preschool children, therefore psychologists and teachers developed in detail the questions of the formation of mental processes with regard to this age. As for the middle and senior school age, the achievements of pedagogy in this segment are very modest, and there is practically no research regarding university students and adults. A.M. Novikov even uses the term "tabula rasa", especially paying attention to the fact that in connection with the paradigm of continuous education, these areas of research are becoming extremely important.

The next type of fragments falling under the wording "knowledge of ignorance" are cliches which in natural sciences are called "... from considerations of symmetry." This phrase is the verbal formula, mentioned at the beginning of the article. To give an example, let us turn again to the study by A.M. Novikov, in which three components of education are distinguished: teaching, education and development. There are six types of connections between them to be derived. According to the author, only two types are well described in the pedagogical literature : educative and developing ones.

The educative type has quite a long pedagogical history. Its "birth" is connected with the name of I.F. Herbart. In Soviet pedagogy, it began to be used intensively in the 1960s thanks to V.M. Korotov, who pointed out that the type of training discussed suggests the achievement of a close connection between the knowledge and skills acquired by students (in terms of the development period of Russian pedagogy under discussion) and the formation of an emotional-value-based attitude to the material studied, to each other , to the real world (Korotov 1997).

The second well-developed type of the connection between teaching, education and development is the developmental teaching associated in the national pedagogy with the names of the leaders of two well-known scientific schools – D.B. Elkonin and V.V. Davydov, who, in their works, consider the problem of the development of theoretical thinking in the learning process.

These two types of connections do not exhaust the list of all the fundamentally possible ones: if we can speak about educative teaching, then there must be a "symmetric" phenomenon - teaching education. The latter denotes a type of educational activity that shapes students' interest in learning, the desire to raise the level of his/her own education, etc. A.M. Novikov also suggests that if developmental teaching exists and is studied, then the symmetric teaching development must exist and be studied too, that is, any student's

appeal to the real world intermediates development, which is to understand as an increment in the cognitive (intellectual), emotional, and volitional spheres of the individual.

The four types of connections between the basic constructs of pedagogy considered do not exhaust their possible list. The links between development and education, which, from considerations of symmetry, should be renamed into developing education and educative development do not appear to have been explored. Meanwhile, the first and second phenomena (types of links) are presented in pedagogical literature quite detailed, but the remaining four have not been studied sufficiently.

One of the undeveloped fragments, reflecting the completeness criterion of the classification used by a pedagogue-researcher, is the independent activity of students. This layer in the pedagogy of higher education is not a logically and contentively completed fragment of knowledge and requires further research at various levels. Such a situation is caused by the fact that self-regulation takes a special place in the structure of this activity: while the management of activities is logically referred to its collective subject, self-regulation is referred to the individual. If, for example, there is a theory of managing the collective activity of individuals, it is obvious that a theory of managing some individual activity has to be developed as well. The collective and individual are considered as two classification elements (the classification is based on the "number of the activity participants"). For example, mental self-regulation expresses the specifics of the means by which the individual reflects the reality and the means of its modeling, the means by which the subject reflects the phenomena and processes of the real world.

According to the generally accepted opinion in psychology, self-regulation includes the goal of the activity adopted and understood by the student and the model of significant conditions of this activity mediated by the goal. The model, in its turn, mediates:

1) constructing the program of performing actions by the individual and formulating criteria for the productivity and success of the result; 2) obtaining information on the correspondence of the actually achieved results to these criteria; identifying the need for some degree of correction of the results achieved. There is a closed regulation circuit and an information process, containing various forms of reality reflection. The question is: how to include the student in such an independent activity that immanently contains all the steps described above, how to provide the necessary motivational component, what specific tasks and projects are to be offered to the student for him/her to develop the skills necessary to carry out these steps on a specific content field of a particular academic discipline – all these questions require further scrupulous research.

In the following section a three-component classification of ways to search for unfinished fragments of pedagogical knowledge is suggested: 1) the situation when a certain technique, technology, approach, etc. are developed for a limited age segment of students and the need for a substantial expansion of the latter is evident; 2) the situation when a certain "direct" connection between two pedagogical objects or phenomena has been developed, but the undeveloped "reverse" connection is evident; 3) the situation when only a part of several problem-content field segments is developed and the expediency of developing the others is evident.

The authors hope that the examples of well-known phenomena and processes of pedagogical reality illustrate quite clearly the essence of the problem discussed, and the beginning researchers will be able to carry out a productive search for pedagogical themes requiring complementation, concretization and innovative solutions.

5. Discussion

The fragments given in the previous section do not exhaust the content field of the problems of independent activity of education subjects, which have not yet been solved in pedagogical knowledge. We consider one of such problems to be students' activity while performing independent work, which includes not only the identification of motivational factors. In psychology three levels of students' activity have been revealed:

1) situational activity, mediated by the need to solve a particular problem, which ends, as a

rule, after the problem has been solved; 2) supra-situational activity, which suggests the ability of the student "to look at the solution of a particular task from above", to consider certain conditions and circumstances, not directly provided by the author of the task, to determine the applicability limits of his/her decision - something that is to some degree superfluous from the point of view of the situational task; 3) creative activity, which anticipates independent setting of problems and tasks by an individual, their step solution with subsequent reflection of the result (Petrovsky 2000). Sometimes these three types of activity are expressed differently, through three levels of performance, corresponding to each of the three levels of activity (in ascending order): operational, tactical and strategic. The analysis of pedagogical literature shows that the pedagogical decision mediated by this three-level scheme is far from logical and comprehensive completion at present and requires serious efforts of the pedagogical scientific community.

One more issue of pedagogy, which has not been developed from the point of view of symmetry principle, is connected with composition and decomposition. If, for example, decomposition is sufficiently complete and detailed in educational programs of various levels (topics of lectures and practical training classes in a particular academic discipline, types of training tasks used in different sections of a training course, task instructions for laboratory work etc.), composition, on the contrary, which is an aggregation of all that (a process that is contra-directional to decomposition and as important), suggesting the creation in students' minds of a holistic picture of the real world, has not been investigated adequately. This is clearly seen in practical learning: integrated courses, widely spread in the 1990s, (for example, "Concepts of modern natural sciences" for humanists) did not fulfill their mission: to form among students holistic, systematic knowledge going with natural sciences. And this example is not the only one.

Finally, one more "white spot" often referred to by methodologists of pedagogy is the methodology of teaching schoolchildren and students. This can be explained by the fact that each individual masters new knowledge, technologies, various skills and strategies of activity in his/her own specific way. So, there is a big number of works dealing with teaching technologies but very few on the problem of technology of learning.

The authors express hope that the text above fully confirms the general scientific thesis saying that the accumulation of scientific knowledge in general and on pedagogical sciences in particular causes a correlated accumulation of "knowledge of ignorance" – that is of those fragments that are currently insufficiently developed or not developed at all. This will allow the authors who are just starting their scientific careers or have already succeeded as scientists, while analyzing the chosen problem-content field of pedagogy, to identify examples, similar to those presented in the article, of the problems the solution of which will increase the degree of correspondence between the content of education, the forms of organization of schoolchildren's and students' activity etc. to the modern social mandate for general secondary and primary education as well as higher education and vocational training.

As can be seen from aforesaid, the fragment "knowledge of ignorance" is the result of intrascientific and methodological reflection on the comprehensive field of pedagogy. The main functions of this component of the pedagogical theory and methodology are to determine the vector of a productive development of pedagogical science, to work out guidelines of scientific activity for pedagogue-researchers and to encourage the beginning researchers to work creatively in the field of theory and practice of education. At the same time, the authors have to accept that the classification of methods used to detect the undeveloped fragments of pedagogical knowledge presented in the article is incomplete and the research in this field needs to be continued.

6. Conclusion

The three-component classification of the search for incomplete fragments of scientific-pedagogical knowledge proposed in the article allows us to presume what has not been included into it yet. For example, non-compliance of the theory and practice of pedagogy, revealed by some researcher, with social requirements for the educational system and the

corresponding segment of inconsistency can be qualified as a fragment of incomplete knowledge. Another vector of searching for incomplete components of pedagogy is the question: To what degree are the ideas of modern education philosophy reflected in this knowledge? If the degree is obviously insufficient, we can speak of another "white spot" in pedagogical theory. At the same time, we clearly understand that the addition of new subdivisions to the incomplete classification requires a substantiation of the possibility to place the new and the previous ones in the same semantic line, that is, a basis for classification has to be found. These are the questions for further investigation of the problem stated, which require priority attention from pedagogy methodologists.

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