



Объект педагогического исследования в контексте связи чувственного, эмпирического и теоретического уровней познания

А. В. КОРЖУЕВ, Н. А. КОНТАРОВ, Ю. Б. ИКРЕННИКОВА

АННОТАЦИЯ

Введение. Статья является одним из возможных ответов на множественные критические вызовы представителей математического, естественнонаучного и методологического сообщества в адрес теоретической невыверенности педагогики – в части научной корректности определения её объектного поля. Авторами обоснована актуальность проблемы отображения объекта исследования педагогической науки на этапах чувственного, эмпирического и теоретического познания, – прежде всего, в контексте осознания степени достоверности предлагаемых исследователями выводов и способов их получения. Конструирование корректной методологической версии такого триадного отображения объекта науки об образовании является целью статьи.

Материалы и методы. Источниковый анализ контента, связанного с отображением степени методологической выверенности современной педагогики; личный исследовательский опыт участия в работе диссертационных советов, Научного Совета по методологии Российской академии образования, руководства аспирантами и докторантами, а также анализа читательских и рецензентских откликов на предшествующие статьи и монографии методологической проблематики.

Результаты. Обоснована авторская версия отображения объекта педагогики на чувственном, эмпирическом и теоретическом уровнях. Конкретизирован переход от чувственного объекта к его эмпирическому образу, а также к теоретическому идеализированному объекту – посредством содержательного обобщения эмпирических результатов с нахождением возможности корректного категориального обозначения. Обоснован второй способ конструирования идеализированного объекта педагогики – проецирование объекта антропологического статуса на содержательное поле образования. Выявлены отличия идеализированных теоретических объектов в естествознании и в науках, изучающих образование. Приведены примеры «эволюции» педагогического объекта в процессе углублённого его исследования. Осуществлена рефлексия некорректных критических вызовов, отрицающих наличие у педагогики эмпирического формата.

Заключение. Предложенная версия разделения объекта наук об образовании в связи с различиями чувственного, эмпирического и теоретического уровней познания призвана способствовать более точному, чем это осуществляется современной педагогикой, осознанию степени выверенности получаемых исследовательских результатов.

КЛЮЧЕВЫЕ СЛОВА

чувственное, эмпирическое и теоретическое познание, объект исследования, методологическая корректность, эмпирический образ объекта, теоретический идеализированный объект, концептуальная модель

Для цитирования: Коржуев А. В., Контаров Н. А., Икренникова Ю. Б. Объект педагогического исследования в контексте связи чувственного, эмпирического и теоретического уровней познания // Перспективы науки и образования. 2026. № 2. С. 10–22. <https://doi.org/10.32744/pse.2026.2.1>

Поступила: 11.10.2025 | Одобрена: 12.12.2025 | Опубликовано: 30.04.2026



Лицензия «С указанием авторства — С сохранением условий». Позволяет перерабатывать, исправлять и развивать произведения при условии указания авторства и лицензирования производных работ на аналогичных условиях.



The Object of Pedagogical Research in the Context of the Connection Between Sensory, Empirical and Theoretical Knowledge

A. V. KORZHUEV, N. A. KONTAROV, Y. B. IKRENNIKOVA

ABSTRACT

Introduction. This article is one possible response to the multiple critical challenges from representatives of the mathematical, natural science, and methodological communities regarding the theoretical imprecision of pedagogy – in terms of the scientific correctness of defining its object field. The authors substantiate the relevance of the problem of mapping the object of pedagogical research at the stages of sensory, empirical, and theoretical cognition – primarily in the context of understanding the degree of reliability of the conclusions proposed by researchers and the methods for obtaining them. The purpose of this article is to construct a correct methodological version of such a triadic mapping of the object of educational science.

Materials and Methods. Source analysis of content related to mapping the degree of methodological accuracy of modern pedagogy; personal research experience through participation in dissertation councils, the Scientific Council on Methodology of the Russian Academy of Education, supervision of graduate and doctoral students, as well as analysis of reader and reviewer responses to previous articles and monographs on methodological issues. The “blank spots” of the discussed substantive field were identified, and the author’s version of the representation of the object of modern pedagogy was proposed and substantiated.

Results. The author’s version of the representation of the object of pedagogy at the sensory, empirical, and theoretical levels is substantiated. The transition from the sensory object to its empirical image, as well as to a theoretical idealized object, is specified through a substantive generalization of empirical results, identifying the possibility of an accurate categorical designation. A second method of constructing an idealized object of pedagogy is substantiated – projecting an object of anthropological status onto the substantive field of education. Differences between idealized theoretical objects in natural science and in the sciences studying education are identified. Examples of the “evolution” of the pedagogical object during in-depth research are provided. Incorrect critical challenges denying the existence of an empirical format for pedagogy are reflected upon.

Conclusion. The proposed version of dividing the object of educational sciences in connection with the differences between the sensory, empirical, and theoretical levels of cognition is intended to facilitate a more accurate understanding of the degree of validity of research results than is achieved in contemporary pedagogy.

KEYWORDS

sensory, empirical and theoretical knowledge, object of research, methodological correctness, empirical image of an object, theoretical idealized object, conceptual model

For Citation: Korzhuev, A. V., Kontarov, N. A., & Ikrennikova, Y. B. (2026). The Object of Pedagogical Research in the Context of the Connection Between Sensory, Empirical and Theoretical Knowledge. *Perspektivy nauki i obrazovaniya* = *Perspectives of Science and Education*, (2), 10–22. <https://doi.org/10.32744/pse.2026.2.1>

Received: 11 October 2025 | Approved: 12 December 2025 | Published: 30 April 2026



This is an open access article distributed under a Creative Commons Attribution-ShareAlike International License (CC-BY-SA 4.0) that allows others to share the work with an acknowledgement of the work’s authorship and initial publication in this journal

INTRODUCTION

UNESCO documents note that "We need a more intelligent nuanced view on education and schooling that builds on systems and complexity theories and humanistic educational approaches" [1, p. 5]. UNESCO documents also state that "A long and important heritage of educational research exists from the beginning of the twentieth century and beyond, with a diversity of works, currents and perspectives, cultivating and crystallizing influential genealogies of thought and action. Educational research allows us to better understand the reality of what is occurring in schools, classrooms, and the many sites where education takes place. It also provides insights into the transformations taking place in individuals, in communities and in society at large. In this way, education must be understood not merely as a field for the application of external experimentation and study, but as a field of inquiry and analyses itself" [2, p. 123]. These documents unequivocally attest to the significance of methodologically sound research within the substantive field of education.

However, pedagogical knowledge and the methods for its acquisition and analysis of results are currently subject to multiple critical challenges from the mathematical and natural science communities, as well as from professional epistemologists. Formulations reflecting the objects of the pedagogical field, the stylistic and logical soundness of proposed hypotheses, and the methods for their verification are recognized as methodologically insufficiently rigorous. Much criticism is leveled at the lack of quantitative substantiation for conclusions in pedagogical works. Pedagogical definitions, methods of classifying objects and phenomena, and technologies for the statistical processing of experimental data are intensely criticized. A number of researchers sharply dispute pedagogy's claim to empirical and theoretical status, notably [3]. The assessments of many foreign authors are also critical: the authors [4; 5] describe this field of knowledge as convoluted and chaotic. The relevance of a more precise methodological delineation of the object of educational theory is indicated by [6], while the need for a reasoned scientific dialogue on this problem is noted by the team of authors of [7]. A historical panorama of the methodological dialogue concerning the problems of pedagogy is presented in the article [8]. The conclusions formulated in this paper correlate with the content of the article [9]. The palette of scientific arguments suitable for drawing conclusions regarding the correct methodological attribution of pedagogy is offered by the team of authors of the article [10], and their findings are consonant with those presented in [11], which couples pedagogy with psychology. Methodological conclusions in the context of the interdisciplinary connection between pedagogy and psychology, particularly regarding the correct demarcation of their object fields, are declared in [12], and the proposed versions substantially coincide with the conclusions of [13]. The logical layer of argumentation within the discussed substantive field is substantiated in [14], which analyzes, alongside theoretical and empirical support, teleological justification and arguments from faith and common sense. The philosophical content of scientific pedagogy, contributing to an increased degree of justification and corroboration of its conclusions, is reflected in the text of research [15]. The correctness of causal analysis of pedagogical objects and phenomena, combined with arguments from scientific authority, is analyzed in detail in the article [16]. A profound discussion of the problems of argumentation in the field of educational sciences, which clearly presents its differences from the natural sciences, is offered in [17]. The influence of the soundness of pedagogical science's conclusions on the possibility of their practical application is investigated in [18]. The relevance of the topic stated in the title is positioned within the status of critical pedagogy by the authors of [19] and [20]. The authors of the entire discussed body of work converge on the opinion that modern pedagogical science urgently requires deep methodological correction in principle, and in particular, in connection with its object field.

It is deemed necessary to continue the review of theoretical research related to the epistemological status of pedagogy with an analysis of works in which a methodologically sound scientific dialogue is projected into the segment of practical school and university education. Among them is the work [21], which proposes techniques for developing critically oriented thinking skills in school and student audiences, as well as the article [22], dedicated to correct educational dialogue. Similar content, focused on special training in argumentation techniques, can be found in [23]. Particularly important are studies that consider critical thinking as a paramount quality of a teacher proficient in the methodology of pedagogical knowledge. For example, the work [24] focuses on the connection between the teacher's critical thinking and creativity; a related problematic is investigated in [25]; many conclusions from these articles are focused on the segment of teacher education in [26]. The articles [27; 28] are devoted to the formation of critical thinking by engaging

schoolchildren and students in educational discussions, considering both classroom and online discussions. The research [29; 30] is dedicated to the use of non-standard dialogical scenarios in teacher training; a wide spectrum of critically oriented dialogical strategies in the context is discussed in the article [31]. The conclusions of the researchers cited in this paragraph converge on one point: only a methodologically competent teacher, capable of substantiating their own point of view and proficient in the skills of participating in scientific dialogue, can form critical thinking in schoolchildren and students. Such a teacher must understand not only the content of the educational sciences but also be aware of the methodological status of all components of the acquired knowledge and the methods of its acquisition. Nevertheless, the cited works testify to a significant discrepancy between the desired and the actual in the discussed context, and therefore, the research undertaken in this article also has practical significance.

This research proposes to implement a methodological intervention into the outlined problem regarding the aspect related to the level-based representation of pedagogical research objects of varying scale. The definition of such an object proposed by Novikov as “the development of a person’s life experience” [32, p. 25] and the definition by Kraevsky “the object of pedagogy is education as a socially and personally determined activity, characterized by pedagogical goal-setting and guidance, for introducing a growing person to the life of society” [33, p. 70] require specification, structuring, and projection into the segment of the triad “sensory – empirical – theoretical”. This is because the scientific reliability and validity of the conclusions put forward by the authors are associated with such a distinction. Substantiating the necessity of this distinction and proposing a specific version of it is *the aim* of this article.

MATERIALS AND METHODS

The research process employed source analysis, drawing upon foreign and Russian articles and monographs on the methodology of the humanities, with a focus on reflecting upon the methodological attributes of modern pedagogy. The authors of the research also extensively relied on the systematization of personal research experience: supervising postgraduate and doctoral students seeking academic degrees in pedagogical sciences, participating in the work of dissertation councils and the Scientific Council on Methodology Problems of the Russian Academy of Education (A.V. Korzhuev is a member of the Council), and analyzing responses to previous scientific monographs and periodical publications authored by the team prior to this research. The publications appeared in journals such as *Voprosy Filosofii, Obrazovanie i Nauka, Vysshee Obrazovanie v Rossii (Higher Education in Russia), Pedagogika, Educational Philosophy and Theory, Journal of Curriculum and Pedagogy*, and a number of others. The analysis of this specified experience substantiated the relevance of the topic stated in the title, determined the degree of its current development, identified “blank spots,” and provided the authors’ substantive elaboration of them.

RESULTS

Object definition in the humanities field. Proceeding from the view of an object as a Kantian “thing for us” and the resulting thesis that “without a subject there is no object,” it is noted that for pedagogy, this is reflected in the cliché of the “living object” – the educating human with a multitude of individual characteristics pertaining to the subject areas of various sciences that have not yet found a way to unite their results into a certain integrity. It has been considered that the disciplines related to the science of education are psychology of education, sociology, management theory, cultural studies, and a set of neuro-disciplines (neurophysiology, neuropsychology, neurolinguistics, and a number of others). Their research results serve as the basis, the starting point for constructing conceptual models of pedagogical phenomena, which mediate the development of methodological models in the sphere of teaching and upbringing. A second consequence arising from the “thing for us” is the thesis about the advisability of coupling the object with a “frame of reference” chosen by the researcher themselves for various reasons, a specific perspective for its consideration. For the pedagogy under discussion, the following examples are relevant: education as a managed system and the connections between its elements (1), education as a sociocultural phenomenon

(2), education as a civilizational resource (3), education as a service (4), and a number of others. A third consequence addresses the awareness that scientific knowledge is mediated not only by the content of the researched object but also by the instrumental resources available to the researcher, their "resolving power," and the limitations on the depth of penetration into the object field. To these resources, many others are added, for example, the volume and content of knowledge accumulated by a specific moment in the research process – both in the specific domain of the object's belonging and in related ones. One must not forget the sociocultural context of the development of the field of knowledge to which the object intended for correct representation belongs, not least because the subject of modern research is, in most cases, not an individual scholar but scientific collectives (the collective subject of science). These collectives are inevitably subject to the regulations of the division of scientific labor and connected by a multitude of complex links. For the human sciences, the influence of non-scientific factors is extremely relevant, for example, a dynamic social demand, societal worldview attitudes, and the political climate.

Discussing the object of pedagogy in its main purpose (correctly limiting the field of research review), one should mention such a feature of its "partner" – the subject of scientific cognition – "which condemns it to exist in a linkage of two elements: the object of cognition and the conditions of cognition" [34, p. 126]. This mediates a specific "frame of reference" chosen for analyzing the object. It is often called the cognitive frame of reference [Ibid.], which includes, in particular, presuppositional knowledge of a philosophical, historical, sociocultural, axiological, and methodological nature, somehow appropriated by the subject of cognition. Based on the appropriated segment of this knowledge, the subject, in a form inseparable from the specifics of their scientific existence, becomes an "active builder" of their own cognitive system. Based on research interests formed by the discussed moment, external demand indicating the theoretical or practical relevance of the chosen problem, the scientist identifies themselves with a specific segment of the presuppositional field, identifies that "blank spot" which they can claim to fill, most often having in mind at least a rough sketch of the research concept. Of course, the components noted above, influencing the choice of the cognitive frame of reference, can be profound, stable, and sometimes, conversely, situational, changeable, and random. However, in any case, they significantly influence the terminological representation of the object of the upcoming research, whether single-component or characterized by a certain structure. The definition of the object, in turn, mediates the choice of one or another cognitive scheme for its research, which includes finding the "problematic link" in the object itself or (most often) in its connections with other objects, putting forward a hypothesis with a subsequent research cycle, described in detail in epistemology and in the particular methodologies of the natural and human sciences.

The chosen logic for developing the theme stated in the research title involves identifying the specifics of the object in the social sciences and humanities. Unlike the objects of natural science, it represents a "supra-complex and evolving system, consisting of large and small collectives of people with their own goals, interests, consciousness, will, material resources, which are often not just substantially different but also opposite in content and direction, as well as changeable over time" [34, p. 225]. Such a complexly represented and delineated object from the humanities' substantive field is incorporated into a series of complex procedures within the research process. These include monitoring a particular parameter of a specific societal segment's state (e.g., the university education system); modeling social reality, coupled with quantitative and qualitative forecasts; interpreting various slices of this reality, laden with value attributes, and a number of others. Further research task involves identifying the features of the object of pedagogical research as it evolves from the sensory level of cognition to the empirical, and then to the theoretical.

Transformation of the object of pedagogical research in the "sensory – empirical – theoretical" nexus. In the process of sensory cognition, occurring at the level of perceptions and sensations, the research content includes real objects of the surrounding world. In pedagogy, these are students attending classrooms or professionals undergoing advanced training, numerous teaching aids (textbooks and manuals, computers and tablets, multimedia projectors and display screens, laboratory equipment, classrooms, simulators, models), teachers and auxiliary educational staff, and documents regulating the educational process. Also included are the numerous connections and relationships they inevitably enter into with each other in the educational process. Here, one of the important components is the "biological norm of perception" [34, p. 202], characterized by parameters such as the threshold of auditory or visual sensation, the speed of perceiving fragments

of a dynamic image, sensory sensitivity, the degree of reaction to external stimulation, and a number of others. A completely different picture emerges at the empirical level, where sensually represented data are transformed through various operations into statistical arrays, graphical or diagrammatic models, qualitative linguistic (verbal) descriptions of occurrences in pedagogical reality using terms that the researcher has managed to find with varying degrees of accuracy to adequately represent the fragment of educational reality of interest to them. At this level of cognition, abstraction is inevitable – a transition from the real object of pedagogical reality to its empirical image, which typically disregards aspects and features of the object that are not of interest to the researcher. For example, a student participating in an empirical survey “transforms” into an object of science possessing mathematical abilities, expressed in the skill to solve a certain class of problems. The proposed list of tasks can be ranked by the experimenter according to difficulty level, and the quantitative indicator could be the number of points scored in a control task. All other properties and qualities of the individual are thereby excluded from consideration, and moreover, it is assumed that their differences do not affect the parameter under investigation. This is clearly the creation of an empirical model of the object, which is inevitably and incomparably poorer than the sensory image of the object in the researcher’s consciousness. The researcher’s choice of the segment for scientific inquiry (the research target of the education scholar) acts as a kind of filter for the sensory information flowing from the “sensory object” to the researcher’s analyzers. A filter inevitably leaves the rich palette of the studied object’s properties and qualities outside consideration. An even stricter filtration occurs during the transition to the empirical image of the object, when the schematization of sensory data and attempts to identify one or another empirical regularity enter the research arena.

It should be noted here that the process of “transforming” a sensory image into an empirical one is not strictly logically determined (excluding gross violations of logic) but is constructive in nature, whereby only one of the many segments of the real object (the one interesting to the education researcher) enters the research optic. In other words, the researcher’s choice plays a significant role. Poincaré called sensory images of objects naked facts [35], which the scientist transforms into scientific facts through empirical analysis. This is a rather complex process where, under conditions of repeatability of the empirical experiment within the segment identified by the teacher-researcher (the ability to solve mathematical problems of a certain orientation), a particular regularity is recorded; for example, based on mass recurring errors, a lack of formation of some component of knowledge or skill among participants is identified – naturally, without deep causal and conditional analysis. If corresponding errors in the solutions presented by students recur, then an assumption arises about the presence of a scientific fact – this is the result of a “synthesis of the intuition of the object and its mental processing by means of thinking” [34, p. 203]. Scientific facts most often have a statistical nature and offer the scientific community knowledge about the presence or absence of a certain property or quality in the researched object. At this stage, based on the analysis of data recorded in research protocols, presented in the form of tables, diagrams, or visual schemes (which have shown a noteworthy degree of repeatability), the researcher, in one way or another, incorporates the empirical object into a certain theoretical grid, attempting to represent the recurring event in the experiment using already known linguistic constructs (or modifying them at their own discretion). The object becomes an element of an empirical regularity; for example, a university student demonstrates an inability to find indefinite integrals (of a specific type) when solving differential equations. Or: when solving problems on the dynamics of a rigid body, they do not master the formulas connecting linear and angular quantities. This can rightly claim the status of an inductive empirical generalization of the properties of an object immersed in a situation defined by the researcher. Such an intermediate result of our consideration closely leads to examining the transition from the empirical object to the theoretical one.

Here, a discussion of the methods for constructing a theoretical, idealized object is inevitable, which is highly problematic for the science of education. In natural science, the difference between theoretical and empirical objects lies in the fundamental unobservability of the former, the absence of sensory correlates for them (the impossibility of ostensive definition). There is no definition of a point, a straight line, or a plane in geometry. Empirical objects have reproducible, fundamentally observable content, while theoretical objects are merely a “certain non-contradictory subject unit of rational thinking” [34, p. 247]. Modern epistemology proposes three ways to construct idealized objects: idealization through a limiting process, mental construction without reliance on empirical experience, and the implicit introduction of an idealized object via a system of axioms [34, p. 287]. The latter two methods are, in most cases, unsuitable for the pedagogical field, and the focus is

mainly on the first, more precisely, on the procedure of its construction, somewhat analogous to that widely used in natural science. In physics, this method introduced concepts such as an ideal gas, a material point, an absolutely rigid body, an absolutely black body, and a number of others. The method for constructing such objects is a thought experiment, in which the researcher approximates the parameters of real objects to the minimally or maximally possible values. A material point is a body of vanishingly small size, an absolutely black body is an object with the maximum possible coefficient of absorption of external radiation.

An important advantage of idealized objects in natural science is the possibility of including their quantitative characteristics in equations: fundamental laws, particular regularities, theorems, etc. In the sciences of education, such a possibility does not exist. If the empirical objects of pedagogy belong to a specific experimental sample, then the theoretical idealized objects of the sphere of education belong to a broad field, obtained by substantiating the possibility of expanding the volume of the empirical sample (in the language of mathematical statistics: to the volume of the general population). Furthermore, the transition from the empirical designation of an object to a theoretical one implies a special stylistic representation. Thus, the student identified based on the survey of the aforementioned array of results from solving mathematical problems, who lacks a certain component of knowledge or skill (an empirical object), is represented as a learning individual, attributed with a type of cognitive barrier widespread in the university environment, as an idealized theoretical object. Such a generalized image is an element of theoretical conceptual models, an object of pedagogical interventions, the results of which, at the stage of ascent to the concrete, are analyzed from the point of view of the area of application in the real educational environment.

Pedagogy has long operated with larger-scale theoretical objects, such as upbringing. Certainly, many various components (elements) of such an object have real embodiment in the educational environment. However, speaking of upbringing as a theoretical object, one should focus on the categorical designation of the phenomenon (with a certain degree of abstraction from specifics), which, unlike in the natural sciences, combines many particular features, empirical facts, and regularities into a generalized whole. Such a mental construct operates not with specific pupils and educational institutions, educational actions, but with their ideal images, accumulating and generalizing empirically identified features (characteristics, and sometimes parameters) in the educational environment and representing them through scientific terms and categories: the subject of upbringing; educational influence; educational effect; a quality of personality formed through such influences, and a number of others.

As in physics, ostensive definitions are impossible for idealized theoretical objects of pedagogy. However, if a material point, an absolutely rigid body, an ideal gas in physics allow inclusion in a particular set of mathematical equations (implying certain operations with such objects), then in the science of education, the theoretical object under discussion can be subjected to a series of mental operations differing from those noted above. For example, a thought experiment that rarely allows quantitative representation: the scientist, based on an analysis of the experience of previous generations of teachers and their "immersion" in modern reality, constructs a conceptual plan for transforming a segment of upbringing (existing in the discussed time interval); often such a product is today called a conceptual model of the process or phenomenon under study. Such a model inevitably includes elements of causal and conditional analysis. For instance, it almost always includes lists of pedagogical conditions conducive to the realization of the author's plan; the proposed conditions are divided into necessary and sufficient (sufficient but not necessary; necessary but insufficient).

An idealized theoretical object in natural science is almost always attributed with a quantitative parameter. In pedagogy, such a possibility is quite rare. For objects in the field of instruction, it is possible to construct scales that, using a set of points, allow for a quantitative assessment of the student's educational result. These results presented on scales are sometimes ranked according to three levels of formation of the ability or knowledge studied by the teacher-experimenter (high, medium, low). Various coefficients of the assimilability of certain elements of knowledge are also applied – as the quotient of the number of assimilated elements divided by their total number. The dynamics of these indicators are represented by graphical dependencies, bar or pie charts, histograms, and a number of other methods. Statistical methods for processing quantitative results from control and experimental groups of students and schoolchildren are widely used; sometimes it is possible to build correlation dependencies: for example, the coefficient of assimilability of a certain knowledge (variable Y) on the number of presentations of these elements to the learner in

the educational process (variable X). In terms of theoretical purity, such methods of quantitative description of the object undoubtedly lose to natural science methods; however, this is a mitigating circumstance quite adequate to the complexity of the research object for pedagogy.

Discussing the idealized theoretical object in pedagogy, it should be noted that the inductive generalization of empirical regularities with the assignment of categorical attributes described above is not the only way to construct such an object. The analysis of literature demonstrates such a method of its construction as projecting an object of philosophical consideration onto the substantive field of education. Examples of such an idealized object include the anthropological cliché “the educating human” in a historical retrospective. In the Renaissance era, such a subject was represented as a being acquiring the ability to build its own life based on the idea of the divine essence of the soul. At the turn of the 19th and 20th centuries, the picture changed: the discussed subject began to be considered in the context of inclusion in socio-historical reality and awareness of one’s life mission, mediating comprehensive development in accordance with natural inclinations and abilities. Modernity has added to the “educating human” the task of forming abilities for integration into the space of culture, interpreting cultural codes, as well as mastering a wide range of communicative skills, including information and computer skills. The theme of self-awareness of the educating individual and building one’s own life based on participation in a multifaceted dialogue with the surrounding society has become actualized. In specific pedagogical studies of the most varied scale and substantive orientation, the choice of the research object is inevitably associated with the representation of the research subject, implying the choice of an appropriate “angle of view” on the chosen object corresponding to the theme, for example: a university student as a subject mastering a particular competency indicated in the educational standard.

It is advisable to supplement the above reasoning with the evolution (transformation) of the object of pedagogical research within the research process itself. For example, an object singled out from the object of science as a whole (e.g., instruction) for a specific study (e.g., the formation of mathematical thinking in students of a specific university segment at the junior level) can be refined: expanded or, conversely, narrowed, specified. This happens, as a rule, at some intermediate stage of the work, when unexpected but recurring side results appear, requiring the inclusion of components not previously present in the initially declared object. The analysis of the representative content of pedagogical dissertations allows concluding that such operations with the object are most characteristic of historical-pedagogical research. For instance, when the author initially declares one historical period for the birth, maturation, and development of a certain pedagogical idea, but during the work, it is discovered that its traces appear much earlier than the lower boundary of the previously indicated time segment. Or, when, declaring a single pedagogical idea within a certain time interval, the author accumulates during the work a mass of material testifying to the connection of this idea with another – the initially designated object has a legitimate right to expansion.

At this stage, the conclusion about the necessity of segmenting the object field of pedagogy in each specific pedagogical research into three parts is declared: objects of the sensory level (1), the empirical level (2), and the theoretical level (3). At a minimum, this is to prevent superficial, unsubstantiated conclusions at the sensory level, as well as conclusions at the empirical level that are not represented in terms of mechanisms and causes, requiring in-depth theoretical analysis of the researched object or phenomenon.

DISCUSSION

In this section, it is deemed necessary to present a synthetic consideration of the triad of pedagogical objects – by representing their interconnections through the language of pedagogical methodology (in a sense, this consideration can be attributed to the meta-theoretical level). Designated, for example, in the monograph [34, p. 259], this level is projected into the topic of this research as the methodology of pedagogical research, an integral component of which is the correct encoding of the object. The methodology of pedagogy is, of course, not limited to this thematic, but one of its core objects is of interest: pedagogical theory, the possibility and actuality of pedagogical claims to a theoretical format. There is no doubt that constructing a pedagogical theory following the model of mathematical (axiomatic) and natural science theories is impossible

today and in the foreseeable future. Therefore, it is considered possible to turn to the resources of domestic methodology of science and find the term "empirical theories" as an analogue [34, p. 272]. In the authors' opinion, such a combination lacks clarity in representing the object, as it mixes two fundamentally different levels of cognition. This research will use the term "descriptive theories" or theories of a "low epistemological version," assuming that their antipodes are mathematics and natural science ("high epistemological version").

Natural science knows many such descriptive theories, for example, the astronomical theory of Kepler, based on Brahe's observations of the movements of planets in the Solar System. Based on the tables compiled by Brahe, Kepler managed to formulate a number of empirical regularities, in particular, stating that planetary orbits are elliptical and establishing the relationship between the radii of orbits and their periods of revolution around the Sun. These regularities were not placed into a causal format at the time of their establishment – but based on the obtained empirics, Newton managed to formulate the Law of Universal Gravitation, rightly belonging to the theoretical level of cognition. A corresponding analogue in the science of education has not yet been found. Currently and in the foreseeable future, finding a similar "movement" from empirics to theory in pedagogy, as described above, is unlikely to be possible. Today and in the near future, pedagogical theory will most likely be methodologically closer to a concept – a set of provisions reflecting the essence of the author's proposed know-how, logically and substantively interconnected.

Taking this theme as a research object, a number of theses on the methodological correctness of a modern pedagogical concept will be outlined. First, it is advisable to have a stylistically concise, specific formulation of the initial philosophical, psychological, sociological, cultural, or other theses upon which the pedagogical scientific product is intended to be built, reflecting the degree of their conventionality in modern humanities knowledge. For example, a teacher-researcher relying on a humanistic concept born in the distant past must inevitably immerse it in modernity, which, in particular, has given rise to the idea of posthumanism, associated with the work of Ihab Hassan [36]. Today, posthumanism is only in the stage of theoretical formation, but it cannot be ignored. In particular, this doctrine declares the formation of a new model of modern humans, who are an organic part of the technosphere, combining their own personal intelligence with the invasion of artificial intelligence into society, being pragmatic and physiologically perfect. Ignoring this reality inadvertently reduces the practical value of the proposed pedagogical concept, moving it into the realm of theoretical fantasies. Second, the use of clear and correct definitions of the involved objects and phenomena: either genus-species definitions or contextual ones, reflecting the correspondence of the features included in the right (explanatory) part to the chosen context.

Third, the methodological correctness of a particular conceptual model in the field of education implies the author's representation of the nature of the connections, interrelations, and interdependence between individual provisions, which allows the user (recipient) to reconstruct the logical "chain" of the author's intent in their mind. This is directly related to the triad of objects being discussed, which involves correlating the conceptual content with the three levels of objects (sensory, empirical, and theoretical). If each statement is discussed separately, then a gradation is advisable, in particular, according to the following positions: a) an assertion or statement based on specific presuppositional knowledge (psychological, anthropological) or on statistical arrays from surveying a segment of the pedagogical field of interest to the author; b) an assertion put forward based on the inductive generalization of a number of scientific facts or empirical regularities; c) an assertion based on a scientific analogy with justification of what degree of kinship between the original phenomenon and the analogue was chosen for the discussed procedure, and how correctly it was demonstrated; d) an assertion representing a causal, inspirational, or conditional connection, in the latter case preferably indicating the type of condition (necessary; sufficient; both designated simultaneously; necessary but insufficient). Such a concept (conceptual model) has a chance to become the basis for the researcher to construct a methodological model.

In this section of the research, it was also decided to touch upon the question of constructing a scientific fact and, in connection with it, recall the cliché "blank spots" of the scientific field. These are, for various reasons, inaccurately defined phenomena and objects of pedagogy, unidentified causes, and vaguely designated conditions for achieving socially and personally valuable positive outcomes by schoolchildren, students, or adults undergoing professional development cycles. A number of such fragments were found in a book claiming the status of a scientific methodological study [3]. The author notes a phenomenological crisis of pedagogy as a very large blank spot,

representing it as follows: "Probably, few people, when reading pedagogical texts, have thought about what exactly they are reading: a description of an observed phenomenon or a description of reproducible experience? A pity. Because if we constantly ask ourselves this question, we will discover that pedagogy as a science is entirely phenomenological: it describes what an external observer sees" [3, p. 14]. The author continues this thought: "In the case of phenomenology, practice supplies science with new phenomena, and science supplies practice with unconditioned instructions: one must do such and such, one must love one's subject, one must know children, etc. Under what conditions, to achieve what result this 'must' is – is not explained and cannot be explained in principle. Because the link 'condition – action – result' appears only at the empirical level of scientific knowledge. And as long as it is absent, practice cannot receive anything except unconditioned instructions. And, as is easy to see from the literature, the overwhelming majority of recommendations that pedagogical science gives to practice are precisely unconditioned instructions" [3, p. 15].

It is considered possible to label these inquiries with the term "pseudoscience." Elaborating on the research conclusion using this example, it should be noted that the author relies on a truncated definition of phenomenology, widely circulated in scientific communities not directly involved with philosophical problems. Referring to philosophical sources presenting the work of past thinkers (Husserl, Ricoeur, Langeveld, Loch, and many others) reveals the historical retrospective of the modern picture of phenomenology, which is incomparably broader than the one presented in the discussed text. However, even if one orients toward the truncated interpretation used by Borovskikh (phenomenology as a presuppositionless description of the experience of the cognizing consciousness and the identification of its essential features within it), many conclusions give serious pause for thought. For instance, the inference that "when reading pedagogical works, the reader should ponder what is before them (a description of an observed phenomenon or a reproducible experience?)" [3, p. 14] is only pertinent within the plane of correlating the "desired and the actual." It is hard to argue that many published pedagogical articles and monographs contain theoretical generalizations based on singular events from the authors' personal experience. Consequently, the methodological models for educational practice derived from such fanciful conceptions hold no value. However, the results of scientifically conscientious pedagogical research are also known and published. In these, conceptual frameworks were formulated based on psychologically verified regularities, enabling the construction of sound and practically valuable methodological models. These were introduced into educational practice multiple times, adjusted based on pilot implementation results, and then reintroduced in a modified form. This cycle was repeated more than once. Examples from the recent Soviet past in pedagogy include the experimental testing and implementation of Academician V.V. Davydov's theory and methodology of developmental education in secondary schools. At all intermediate stages of the pedagogical experiment, the participants meticulously recorded the students' educational achievements; based on the analysis of these results, adjustments were made to the initial methodological conception, and the research cycle was repeated. Another interesting example is the testing in the early 1960s in the USSR of the idea of transitioning primary school from a four-year to a three-year program (author of the idea and head of the experiment: Academician of the USSR Academy of Pedagogical Sciences L.V. Zankov). Initially, this theoretical concept and its accompanying teaching methods were tested in only two experimental school classes, later within one school, and then in a number of schools in the city of Kolomna. Only after such a pilot stage (whose results were seriously discussed multiple times) did the development receive the green light for large-scale implementation within a number of regions, and subsequently across the entire former USSR. Many modern examples of conscientious pedagogical research are also known, which describe reproducible educational experience (in which Borovskikh denies pedagogy) and not merely an observed phenomenon.

The entire content of this research presents a serious rebuttal to Borovskikh, who denies pedagogy empirical attributes, primarily concerning the object of pedagogical research. In this section, discussing the meta-theoretical level, the objection will be supplemented with the existence of such an empirical fragment as the eLibrary.Ru database, which records the scientific achievements of members of the scientific community. It records not only the articles and books of scientists but also their citation metrics, assigning them a specific parameter (the Hirsch index N), equal to the number of scientific works cited at least N times. The precise theoretical justification for it has not yet been found in the literature, but this empirical model has been operational in scientometrics for a long time, alongside many other examples of empirical attribution discussed above.

It has been deemed necessary to supplement the examples of a pseudoscientific approach regarding the objects of pedagogy and turn again to the work of Borovskikh [3]. This concerns a large-scale object of pedagogy – the content of education. The author attempts to refine the currently accepted stylistics and semantics in pedagogy by adding the new concept of the “*substance*” of education to the traditional *content*. This *substance of education* is positioned as “that matter which is presented in a given form; it is objective, often material, visible. *Content* is subjective, invisible, can only be thought of, and is the function that this matter performs in our life and activity” [3, p. 34]. Specifying her own vision of *the content* of education, the author notes that “to represent it, it is necessary to see the totality of mental tools that allow one to think about the relationships between various entities with which we deal both in life and in professional activity” [37, p. 35]. The objectivity of *content* and the subjectivity of *content* are not commented upon and do not correspond to the modern philosophical representation of these two categories. It has been attempted to understand this by referring to how the author in this article reveals the content of mathematical education: she includes in it the *totality of relations between quantities and their changes, and between elements of figures*. However, before defining the relations between entities (as Borovskikh calls them in the book), the author forgets to reveal what these entities themselves represent, “with which we deal both in life and in professional activity” [37, p. 35], or what their list is. By proposing a definition of a core object of pedagogy (the content of education), the author *omits* the very elements, the relations between which a schoolchild or student must learn: undefined concepts of mathematics, axioms, theorems, their corollaries, lemmas, the symbolic system for representing various elements, and much more. It is impossible to build any constructive scheme based on the proposed definition, nor to find its practical value for the sphere of education. This allowed classifying the proposed theoretical construction as pseudoscience.

CONCLUSION

The possibility and necessity of representing its object at three levels – sensory, empirical, and theoretical – during scientific research testifies in favor of pedagogy belonging to the sphere of scientific knowledge. This is primarily for the purpose of understanding the degree of scientific reliability of the conclusions proposed by researchers. The obtained sensory data, sourced from the educational environment, require the construction of an empirical image of objects and phenomena, and subsequently, theoretical ideal objects. In a number of cases, idealized theoretical objects are constructed by projecting an object of philosophical consideration onto the substantive field of education. The theoretical level is currently in a stage of formation, which is reflected at the meta-theoretical level, in the scientific segment called the methodology of pedagogy. Its content contains constructs adequate to the methodology of the humanities, as well as what has been managed to represent using the cliché “pseudoscience.” The identified “blank spots” in the methodological field of pedagogy suggest the need for further research in this area.

REFERENCES

1. UNESCO: Futures of Education: conservation and change Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000374087?posInSet=3&queryId=78e0a0eb-5ba2-4994-96f5-354d979846b6> (accessed 24 October 2025)
2. UNESCO: Reimagining our futures together. A new social contract for education. Available at: <https://unesdoc.unesco.org/ark:/48223/pf0000379707/PDF/379707eng.pdf.multi> (accessed 24 October 2025)
3. Borovskikh, A. V. Activity-Based Pedagogy. Schemes of Pedagogical Thinking. Moscow, Max-Press, 2020. 352 p. (in Russ.)
4. Snaza N. Aleatory entanglements: (Post)humanism, hospitality and attunement – A response to Hugo Letiche. *Journal of Curriculum and Pedagogy*, 2018, vol. 14, pp. 256–272. DOI: 10.1080/15505170.2017.1398700
5. Letiche H. Bewildering pedagogy. *Journal of Curriculum and Pedagogy*, 2017, vol. 14, pp. 236–255. DOI: 10.1080/15505170.2017.1335662
6. Leš T. The research potential of educational theory: On the specific characteristics of the issues of education. *Educational Philosophy and Theory*, 2017, vol. 49, issue 14, pp. 1428–1440. DOI:

- 10.1080/00131857.2017.1313716
7. Nussbaum M. E., Dove I. J., Putney L. G. Bridging dialogic pedagogy and argumentation theory through critical questions. *Dialogic Pedagogy. An International Online Journal*, 2023, no. 11(3), pp. A7-A25. Available at: https://www.researchgate.net/publication/370481818_Bridging_dialogic_pedagogy_and_argumentation_theory_through_critical_questions (accessed 24 August 2025).
 8. Schwarz B. B., Baker M. J. Dialogue, argumentation and education: History, theory and practice. Cambridge, UK: Cambridge University Press, 2017, 294 p. Available at: <https://doi.org/10.1017/9781316493960> (accessed 04 September 2025).
 9. Gronostay D. To argue or not to argue? The role of personality traits, argumentativeness, epistemological beliefs and assigned positions for students' participation in controversial political classroom discussions. *Unterrichtswiss*, 2019, no. 47, pp. 117–135. <https://doi.org/10.1007/s42010-018-00033-4>
 10. Irawan N., Valentina T. F. The Language of Argumentation: A Book Review. *Journal of Language and Education*, 2021, vol. 7 (2), pp. 274–276. Available at: https://www.researchgate.net/publication/353084234_The_Language_of_Argumentation_A_Book_Review (accessed 24 August 2025).
 11. Zenker F. Introduction: Reasoning, Argumentation, and Critical Thinking Instruction. *Topoi*, 2018, vol. 37, issue 1, pp. 91–92. DOI: 10.1007/s11245-016-9416-x
 12. Kallio H., Virta K., Kallio M. Modelling the Components of Metacognitive Awareness. *International Journal of Educational Psychology*, 2018, vol. 7, no. 2, pp. 94–122. DOI: 10.17583/ijep.2018.2789
 13. Asterhan C. S. C., Schwarz B. B. Argumentation for Learning: Well-Trodden Paths and Unexplored Territories. *Educational Psychologist*, 2016, no. 51(2), pp. 164–187. <https://doi.org/10.1080/00461520.2016.1155458>
 14. Boogaart R., Jansen H., van Leeuwen M. The Language of Argumentation. Publisher Springer Cham, 2021, 323 p. Available at: <https://cyberleninka.ru/article/n/boogaart-r-jansen-h-van-leeuwen-m-eds-2021-the-language-of-argumentation-springer-issn-1566-7650/viewer> (accessed 28 August 2025).
 15. Ennis R.H. Critical Thinking Across the Curriculum: A Vision. *Topoi*, 2018, no. 37, pp. 165–184. <https://doi.org/10.1007/s11245-016-9401-4>
 16. Lommi S. Causal and Epistemic Relevance in Appeals to Authority. *Rivista Italiana di Filosofia Analitica*, 2015, no. 1(6). Available at: https://www.researchgate.net/publication/307838856_Causal_and_Epistemic_Relevance_in_Appeals_to_Authority (accessed 08 September 2025).
 17. Rapanta C., Macagno F. The Dimensions of Argumentative Texts and Their Assessment. *Studia paedagogica*, 2020, no. 24(4), pp. 11–44. DOI:10.5817/SP2019-4-1
 18. Alexander P. A. Reflection and Reflexivity in Practice Versus in Theory: Challenges of Conceptualization, Complexity, and Competence. *Educational Psychologist*, 2017, vol. 25, issue 4, pp. 307–314. DOI: 10.1080/00461520.2017.1350181
 19. Morrow, R. A. Dialogue, Critical Thinking, and Critical Pedagogy. Peters, M.A. (eds) *Encyclopedia of Teacher Education*, 2022, pp. 459–464. Available at: https://doi.org/10.1007/978-981-16-8679-5_320 (accessed 20 August 2025).
 20. Rapanta C. Argumentation as critically oriented pedagogical dialogue. *Informal Logic*, 2019, vol. 39, no. 1. Available at: <https://doi.org/10.22329/il.v39i1.5116> (accessed 04 September 2025).
 21. Ghanizadeh A., Al-Hoorie A. H., Jahedizadeh S. Higher Order Thinking Skills in the Language Classroom: A Concise Guide. Publisher Springer Cham, 2021. 195 p. Available at: <https://doi.org/10.1007/978-3-030-56711-8> (accessed 28 August 2025).
 22. Šedová K., Šalamounová Z., Švaříček R., Sedláček M. Getting Dialogic Teaching into Classrooms. Singapore, Springer, 2020. 184 p. Available at: <https://doi.org/10.1007/978-981-15-9243-0> (accessed 28 August 2025).
 23. Clinton J. Argument as dialogue across difference: Engaging youth in public literacies. New York/London, Routledge, 2017. 178 p. Available at: <https://doi.org/10.4324/9781315619590> (accessed 02 September 2025).
 24. Ellerton, P., Kelly R. Creativity and critical thinking. *Chapter Education in the 21st Century: STEM, Creativity and Critical Thinking*. Springer International Publishing, 2021, pp. 9–27. https://doi.org/10.1007/978-3-030-85300-6_2
 25. Marangio K., Carpendale J., Cooper R. et al. Supporting the Development of Science Pre-service Teachers' Creativity and Critical Thinking in Secondary Science Initial Teacher Education. *Research in Science Education*, 2024, no. 54, pp. 65–81. <https://doi.org/10.1007/s11165-023-10104-x>
 26. Abrami P. C., Bernard R. M., Borokhovski E., Waddington D. I., Wade C. A., Persson T. Strategies for Teaching Students to Think Critically: A Meta-Analysis. *Review of Educational Research*, 2015, no. 85(2), pp. 275–314. DOI: 10.3102/0034654314551063
 27. Rapanta C., Macagno F. Authentic questions as prompts for productive and constructive sequences: A pragmatic approach to classroom dialogue and argumentation. *Dialogic Pedagogy*, 2023, no. 11(3). Available at: <https://doi.org/10.5195/dpj.2023.546> (accessed 02 September 2025).
 28. Martínez J. P. C., Catasús M. G., Fontanillas T. R. Impact of using learning analytics in asynchronous online discussions in higher education. *International Journal of Educational Technology in Higher Education*, 2020, no. 17(39). Available at: <https://doi.org/10.1186/s41239-020-00217-y> (accessed 02 September 2025).
 29. Koivuniemi M., Järvenoja H., Järvelä S. Teacher education students' strategic activities in challenging collaborative learning situations. *Learning, Culture and Social Interaction*, 2018, vol. 19, pp. 109–123. DOI: 10.1016/j.lcsi.2018.05.002

30. Kim M.-Y., Wilkinson I. A. G. What is dialogic teaching? Constructing, deconstructing, and reconstructing a pedagogy of classroom talk. *Learning, Culture and Social Interaction*, 2019, vol. 21, pp. 70–86. DOI: 10.1016/j.lcsi.2019.02.003
31. Spector J.M., Ma S. Inquiry and critical thinking skills for the next generation: from artificial intelligence back to human intelligence. *Smart Learning Environments*, 2019, 6, 8. Available at: <https://doi.org/10.1186/s40561-019-0088-z> (accessed 03 September 2025).
32. Novikov A. M. Foundations of Pedagogy. Moscow, Egves Publ., 2010. 208 p. (in Russ.)
33. Kraevsky V. V., Berezhnova E. V. Methodology of pedagogy. Moscow, New Stage, Academy Publ., 2006. 400 p. (in Russ.)
34. Lebedev S. A. Philosophy of Science. Positive dialectical concept. Moscow, Prospect Publ., 2021. 473 p. (in Russ.)
35. Poincare H. J. About Science. Ed. Pontryagin L. Moscow, Nauka Publ., 1983. 560 p. (in Russ.)
36. Hassan I. Prometheus as a Preformer: Toward a Posthumanist Culture? *Georgia Review*, 1977, vol. 31, no. 4, pp. 830–850. Available at: <https://www.jstor.org/stable/41397536> (accessed 1 November 2025)
37. Borovskikh A. V. To the Concept of Mathematical Literacy. *Pedagogy*, 2022, vol., 86(3), pp. 33–45. Available at: <https://kco-kras.ru/wp-content/uploads/2022/08/Matematicheskaya-gramotnost-Borovskikh.pdf> (accessed 1 November 2025)

Авторы

Коржув Андрей Вячеславович

(Россия, г. Москва)

Доктор педагогических наук, профессор кафедры
медицинской и биологической физики
ФГАОУ ВО Первый МГМУ им. И.М. Сеченова Минздрава
России (Сеченовский Университет)
E-mail: akorjuev@mail.ru
ORCID ID: 0000-0002-7454-038X
Scopus Author ID: 6506830391

Контаров Николай Александрович

(Россия, Москва)

Кандидат биологических наук, доцент кафедры
медицинской и биологической физики
ФГАОУ ВО Первый МГМУ им. И.М. Сеченова Минздрава
России (Сеченовский Университет)
E-mail: kontarov@mail.ru
ORCID ID: 0000-0003-0030-4867
Scopus Author ID: 35748709800

Икренникова Юлия Борисовна

(Россия, Москва)

Кандидат педагогических наук, доцент кафедры
общеобразовательных дисциплин
Российская государственная академия интеллектуальной
собственности.
E-mail: ikren@yandex.ru
ORCID ID: 0000-0002-2141-6289
Scopus Author ID: 57196122317

Authors

Andrey V. Korzhuev

(Russia, Moscow)

Doctor Sci. (Pedagogy), Professor of the Department of
Medical and Biological Physics
Sechenov First Moscow State Medical University
E-mail: akorjuev@mail.ru
ORCID ID: 0000-0002-7454-038X
Scopus Author ID: 6506830391

Nikolay A. Kontarov

(Russia, Moscow)

Cand. Sci (Biology), Associate Professor of the Department of
Medical and Biological Physics
Sechenov First Moscow State Medical University
E-mail: kontarov@mail.ru
ORCID ID: 0000-0003-0030-4867
Scopus Author ID: 35748709800

Yulia B. Ikrennikova

(Russia, Moscow)

Cand. Sci. (Pedagogy), Associate Professor of the Department
of General Educational Disciplines
Russian State Academy of Intellectual Property.
E-mail: ikren@yandex.ru
ORCID ID: 0000-0002-2141-6289
Scopus Author ID: 57196122317

Вклад авторов

Коржув А. В.: концептуализация, методология, создание
черновика рукописи

Контаров Н. А.: проведение исследования, создание
рукописи и её редактирование

Икренникова Ю. Б.: проведение исследования, создание
рукописи и её редактирование

Author's contribution

Andrey V. Korzhuev: Conceptualization,
Methodology, Writing - Original Draft

Nikolay A. Kontarov: Investigation,
Writing - Review & Editing

Yulia B. Ikrennikova: Investigation,
Writing - Review & Editing

© Коржув А. В., Контаров Н. А., Икренникова Ю. Б., 2026

Авторы заявляют об отсутствии конфликта интересов

© Andrey V. Korzhuev, Nikolay A. Kontarov,
Yulia B. Ikrennikova, 2026

The authors declared no conflicts of interest