

Education: theoretical foundations of a scientific perspective

Izglītība: zinātniskās perspektīvas teorētiskie pamati

Luciana Bellatalla

University of Ferrara
Department of Humanities
Via del Paradiso, 12
44121 Ferrara
E-mail: bl1@unife.it

Abstract. The paper deals with four philosophical and cultural ideas (history, nature, knowledge and finally the subject-object relation) in the period from European Renaissance till 20th century, starting from Machiavelli's works and ending with Dewey's logical and educational ideas. The author intends to show how these elements and their changing perspective have affected the thought on education and have, step by step, promoted its emancipation from conformation to social expectations and moral shared values to an epistemological and scientific condition.

Keywords: Education, Epistemology, Science of Education, History of Education.

Introduction

The transition from the level of contingency to the conceptual sphere is possible only if we overcome the idea of education as a phenomenon or as a mere daily practice.

This transition is marked by the ability to think differently at least four factors of the human experience and existence. Education, considered only as a practical activity, conceived as an imitation of the adults' style of life or of influential individuals, as repetition of learned notions, attitudes and socially shared values, for centuries has sustained a socially static vision and a conservative policy, based on the principle of authority and on insurmountable social distinctions. From this perspective, education can certainly be considered as a process of growth, but only within a closed universe: the improvement it may cause means simply to understand and to justify social and cultural order; the transformation is intended only as a transition from one condition of original innocence and ignorance to a state of acceptance of such an order. It is not a true transformation, but only conformation.

This point of view is rooted in four main principles:

- 1) the idea that history is a path independent of the will of men, guided by the Providence of which humans are mere instruments;

- 2) the idea of Nature as an absolute and substantial leading guide of human existence, which keeps development and growth of mankind within impassable bounds;
- 3) the idea that the universe is dominated by the principle of non-contradiction, which causes the absolute and objective certainty of knowledge;
- 4) the idea of an insurmountable dualism between subject and object, I and the world, so that knowledge is nothing but the mirror of an objective order of world, events and things.

Young people, therefore, must simply accept, what the context imposes or proposes: teaching-learning activity is not presented as dialectical process between past and future, subject and object, whose outcome is always a significant change in both the terms of the relationship.

As I have reflected some years since,¹ I intend, in my lecture, to indicate the moments and the thinkers, who from the age of Humanism and thanks to the scientific revolution, have begun to undermine this metaphysical and social monolithic *Weltanschauung*.

In my opinion, the revolution began when the four cornerstones, noted above, began to falter. It has been a process, more than three centuries long, which develops in a continuous and irreversible way, at least at the conceptual level, for the factual aspects of education, unfortunately, still are a land dominated by prejudices, ideological pressure and common sense.

Although I am aware that after Socrates many thinkers have contributed to this process and therefore I cannot be exhaustive, I will focus on some key philosophers, for whom education was not an explicit interest. However, their thoughts and their worldviews were able to affect educational universe and implicitly allowed the transition to a scientific perspective also in this field. And this happened just because these thinkers had no interest in education. In fact, the presence of an explicit interest, as Locke's ideas show, could have restricted theoretical instances in the name of the ideological conditioning elements.

History as men's construction

The first intellectual we meet in this ideal journey is Niccolò Machiavelli with his works *Il principe* and *Discorsi sulla prima decina di Tito Livio*, but also his private letters. He explains the events of ancient history and also of his time from a Republican perspective and rejecting the vision of history inspired by absolute

¹ See, for instance, Bellatalla, L. *Dal concetto di Natura alla Pedagogia come scienza*, in Bellatalla, L., Genovesi, G., Marescotti E. (a cura di), *Tra Natura e cultura. Aspetti storici e problemi dell'educazione*, Milano, Angeli, 2007, pp. 39–49 e Bellatalla, L. *Galileo e la Natura: un'ipotesi per la Scienza dell'educazione*, *ibidem*, pp. 121–134, but also the essays, written in collaboration with Giovanni Genovesi, *La pedagogia di Immanuel Kant*, traduzione, introduzione, postfazione e note, Roma, Anicia, 2009; *L'educazione e la sua scienza nel Discorso del metodo di René Descartes*, Roma, Anicia, 2011; *Il Principe. Un saggio di educazione politica*, Roma, Anicia, 2013.

religious or moral principles. At the time, this is a discourse on politics, considered, for the first time, as an autonomous science and not a field conditioned by Religion (i.e. the Church) or Morals.

Thanks to his thesis, we can conclude that:

- a. Culture, as a methodologically oriented process and a conscious human construction, due to efficacious relations among individuals and social groups, should be considered an essential point in and for the organization of the human existence;
- b. History plays a key role in the process of understanding the existence and to build humanity, no longer considered as a given but as a slow and necessary conquest: this process does not depend on any external and providential Will, but, finally, on autonomous human decisions: therefore, History and Morals should be kept apart, so that the reasons for the politics cannot be attributed to any divine project or to any axiological dimension;
- c. prejudices and tradition should be pulled down. The results of historiographical reconstruction should be subjected to minute and autonomous inspection. Therefore, in the daily individual or social life, everybody should be in condition to be free and to acquire the necessary requirements to exercise his freedom of judgment, action and will;
- d. cultural heritage is important, but only when it is in service of cultural growth and not when it blocks individual and social development, as in the past, when cultural tradition was considered an end and not an instrument for a continuous process of change and improvement.

Man, as Machiavelli defines his peculiarities, is, according to general Humanistic philosophy, a *faber suae fortunae*. And this expression implies some of the characters of education: the intrinsic relation with the history, the autonomy of judgment, the secular approach to the experience, the supremacy of Culture over Nature, the relationship with the others – be they alive and present, or the teacher and ideal “friends” of one’s readings and studies – because they can give meaning and significance to the man’s view of the world.

Nature as a construction in progress

The first reasonable and argued contestation of the metaphysical principle of a perfect and absolute Nature is testified by Galileo’s scientific revolution.

To understand and formulate the laws, which Nature responds to, the Galilean scientist lays the context, in which his research has to be carried out. Thus, the implied observation and experience should be controlled and only control allows the scientist to reach, step by step and in a continuously approximate manner, the definition of those laws, which he aims at. This is the core of Galileo’s thought.

Antidogmatic intellectual habit, the continuous search for new material and intellectuals instruments and for new working hypotheses, the effort of a methodological refinement are requested in the scientific research process. These are recurrent aspects of Galilean thought, together with the polemical relationship with Aristotelian perspective and a secular instance. Galileo’s thought is secular, because

it stands upon the separation of Science and Religion. These elements are the main characters of the scientific modern revolution, which marks the transition from a traditional view of natural and human world to a new conception characterising the process of knowing, knowledge and, finally, Science itself.

According to Galileo, the important duty of a scientist is to act as a go-between scientific perspective and religious belief. For the universe, although *the* work of God is open before men, who should observe it, interpret it and enrich its meanings through their incessant inquiry process. This way is imposed by God himself: Galileo asserts this strongly over and over again. Therefore, the conclusion is: not only the scientist cannot and must not avoid compliance with this divine commandment, which imposes a never-ending research, but also God cannot and must not be considered auto-sufficient, because He needs that men, thanks to process of knowledge-gaining process in some way complete His creative work. God is certainly the author of the world, but His creation can be enriched only through the scientific process of research, as only knowledge improvement augments this significant God's creation, making it more intelligible. Nature rises to a high dignity, because it is placed at the center of the Galilean conceptual universe, as far as it is the focus of human reason to accomplish God's projects, through its effort to understand, to explain and to interpret them. Nature, therefore, although postulated as a datum, in fact, is an element in progress. Its existence depends on the zeal and the diligence of knowing subject (and particularly of the scientist), and on the outcome of knowledge-gaining process. For this new orientation, a neologism could be coined, speaking of a *natura naturanda* to indicate a nature progressively maturing, but never complete, in addition to the traditional definitions of *natura naturata*, to designate the natural data, in which the subject is immersed, and *natura naturans*, generally coinciding with the creative activity of God.

In this perspective, therefore, education can no longer be considered as the process that leads from potency to act or by virtue of which you become what you already are, since the nature ceases to be an absolute datum and becomes the result of a process rather than the starting point, the guide and the goal of the process itself.

Knowledge as a probable construction

The basis of all the ontology that supports the moral manifestations and policies of human society is the logical principle of identity and non-contradiction, according to the premise that "a statement and its contradiction cannot be both be true",² because, as Aristotle stated, "nothing can both be and not be at the same time in the same respect".³

Both from an ontological and logical perspective, then, this principle permits us to conclude that we cannot, at the same time, affirm or deny the same opinion or the same worldview. Therefore, logical sphere, according to this principle, is

² Audi, R. (ed.). *The Cambridge dictionary of Philosophy*, Cambridge, Cambridge University Press, 1995, p. 644.

³ Aristotle, *Metaphysics*, Gamma book, Ch. 3, 1005 b 19–20.

mirror-like to metaphysical one, and both necessarily refer to the fixed character and absoluteness of Nature. In both cases, no exception can be admitted. Being and thought cannot be but exactly identical, so that, as Parmenides taught, “‘the real’... must be ungenerable and imperishable, indivisible and unchanging”⁴ and refers to the domain of Truth. On the contrary, the changeable refers to the domain of appearance, of ignorance or false knowledge.

As the axiom of an absolute and perfect nature, also the logical principle of non-contradiction has been successful not only in the history of thought, but also in the history of culture and society, namely, stated, we can say, by pre-Socratics until Hume.

Religion (with the Providence version) controlled the criteria of Nature and History, while the daily life and common sense accepted the logical principle of non-contradiction. The two elements, in a mutual relation, ensured the established order in the dimension of the present and justify the future expectations, which always had to be no different from what had preceded it. Therefore, education – as tradition and imitation – was the most important instrument to support authority, political power and a social static order.

Hume’s ideas contributed to changing this background. The central element Hume offers to a scientific approach to educational field is to be found in the particularly sceptical suggestions of this philosopher.⁵ His scepticism must not be interpreted in the classical manner as a suspension of judgment (of truth or falsehood). He asserts that human experience has undeniable limits, so that there are good reasons for doubting of the appearance, of tradition and of all data. Knowing activity, to which Hume attributes three degrees of manifestation,⁶ is necessarily a revision of the relationship between Truth and Falsity and ends up giving a new meaning and a new sense to the concept of Truth itself.

Traditionally, as I have already said, according to the principle of non-contradiction, Being and Non-Being faced each other in a play of light without nuance: the consequence is a dualism between True and False, Substance and Appearance, Positive and Negative. Hume has the merit to introduce significant nuances in this framework, in which there are alternatives between light and shadow, phenomena and values are often placed on the same dimension and confused.

Hume, in fact, connects experience and appearance, revaluing the aspects of a transient dimension more than those of a static and absolute Being. Therefore, Appearance is considered the center of human activity through three basic elements that are *imagination*, *habit* and *belief*, which are in close mutual relationship.

Firstly, it is interesting that, for Hume, the senses are the only way towards knowledge. In any case, according to him, ideas also should be reducible to the level of perceptions, because ideas are but “less vivacious” copies of impressions. Thanks

⁴ Audi, R. (ed.), *The Cambridge dictionary of Philosophy*, cit., p. 561.

⁵ The reference is to his most important theoretical works: *Treatise on Human Nature* (1740) and *An Enquiry Concerning Human Understanding* (1748).

⁶ I refer, obviously, to “sensations”, “impressions” (of sensation and of reflection) and, finally, “ideas”.

to this consciousness not only the intellectual activity, but also individual and social life can be organized and, subsequently, developed.

Hence, two consequences are derived, which Hume inherited directly from Locke's empiricism: firstly, nothing may be innate, and thus existing before the process of experience; secondly, since knowledge depends on the variety of all possible experiences, it ends up having undeniable limits, which vary according to the wealth of information. Yet, men are convinced that they know even what they never have had an experience of (for example, a colour gradation or the inside of a strange house never seen before).⁷ At this point, we must ask, what criterion or principle regulates these possible associations.

To answer this question, it is necessary to discuss the logical principle of non-contradiction. Hume, in fact, asserts that 1) the experience rule is based on the belief that the future will be identical, because every existence phase without any change reproduces previous events and characters: for Hume, this presumption, though diffused and largely shared, is inappropriate; 2) nevertheless, as without the leading guide of the past experience, individual and social life would be impossible, human inclination to consider nature and social existence in a static perspective may be understood and justified. In fact, thanks to the great principle of *habit*, experience can be the compass of human society and individual existence: without habits, an individual should be compelled to live only in a present dimension, could not search and find means to reach his goals and to inductively solve difficult situations. In short, an individual could not build a framework of reference points to be used *as if* they were really true, whereas, actually, they are only probable.

It is, therefore, the habit that pushes man to believe that he is living and moving in a world of certainties: from the continuous relation between facts/experiences and beliefs/habits arises the relation between *memory*, i.e., the archive of men's perceptions, and *imagination*, which is the "place" of ideas and of ideation.

Recognizing the centrality of habit and belief (in the name of the function they perform in practice and real life) means at the same time recognizing their conventional and utilitarian character. To believe that the course of Nature is regular and repetitive does not imply that it is really such, but only that our individual and social conduct is inspired by this supposed certainty. The idea of a ruling principle of the world, then, is only the result of man's habits and social needs, but it has not any ontological foundation: in fact, the course of nature and events is ruled only by probability. Hence, we can conclude that "everything that is can also not be" and that "no negation of a fact can involve a contradiction," since the idea that a being is not is so clear and distinct as that of its existence. And, logically, the proposition, which states that it does not exist, is not less conceivable and intelligible than that asserting that it exists.

From a similar perspective arise two significant elements for Education as an object of science: first of all, the principle that the dimension of possibility is wider than that of the real, as far as probability is the cornerstone of human existence;

⁷ This happens because ideas usually are connected by similarity, contiguity in time and space, and cause-effect relation.

secondly, the space to be granted in human life and actions, history should be considered as an open process, and no longer as an incessant repetition of acts and behaviours, with the illusion that the future will be, without a doubt, an exact copy of the past.

So Hume prepares for the concept of education, logically and ontologically radically different, and really new coordinates.

Subject-object: a dialectical relation, not an opposition

This is the last principle to be discussed here. According to this thesis, in the knowledge-gaining process, the subject and the object to be known face each other, because they are mutually separated: the object is ready and complete in front of the subject, who must simply pick it, *as if* he is a mirror reproducing the things in the same forms in which they are seen. From the point of view of education, this thesis has not only nourished a repetitive and mnemonic approach to teaching/learning activity, but has also justified obedience and passivity as the only correct human, moral and social, conduct.

In this particular gnosiological principle, the three theses examined so far meet. In fact, a inquiry activity as a mirror of reality presupposes and, at the same time, justifies and strengthens the conception of a repetitive History, ruled by necessity or Providence, of a perfect and absolute Nature and, finally, of the logical principle of non-contradiction.

Two authors – Hegel and Dewey – marked the transition from a static cognitive vision, thanks to which man can only mirror the environment, to an open and progressive vision of both object and subject. This is an important theoretical contribution, since this new perspective, for which Kantian philosophy had paved the way, marks the transition to an educational and pedagogical awareness, absent in the authors treated so far.

Hegel deals with education and especially educational institutions only as far as these questions concerned his teaching activity at the university.⁸ However, his interest in the history of man and in the mechanisms of civil society is undeniable, i.e. in two aspects that cannot neglect the evolution of the individuals and social groups, and, consequently, cannot ever neglect the human *Bildung* processes. Nevertheless, the interest in education and in its universe is still more implicit than explicit and, above all, refers to a general and generic idea of education.

On the contrary, Dewey is well known as one of the most important educational theorists of the past century. He, however, came to educational questions and pedagogical reflection in the nineties of the 19th century, after having been fascinated by Hegelian philosophy. Then he became a philosopher of education (as he liked

⁸ In Italy, Hegel's articles on these questions are translated and discussed in G. W. Hegel, *La scuola e l'educazione. Discorsi e relazioni (Norimberga 1808–1816)*, a cura di Sichirolo, L. e Burgio, A. Milano, Franco Angeli, 1985.

to say), and not by chance. Beyond what has been said about his “conversion”⁹ to social problems and, in particular, to education and school matters, and beyond contingent events, which attracted Dewey’s attention to education challenge, we can conclude that the transition from philosophical themes to pedagogical reflection was made possible only as a consequence of Hegelian heritage. In particular, I refer to the concept of dialectics, Hegel wrote and articulated this conception as foundation for a possible Science of education, because dialectics is grounded on the principle of relationship.

Dialectics – compared to the traditional approach to knowledge – shuffles the cards, since the hitherto static roles of subject and object lose their rigidity and their fixed character. Relationship becomes the building block of a logical problematical construction and of an open ontological system. Moreover, the dialectics fulfils the argument that denies the principle of non-contradiction, putting in crisis not only the logical and gnosiological, but also the ontological concept of identity. Beings and appearances are always, in fact, a match and even a clash among different realities. Through these continuous oppositions, human and historical existence can develop, conferring to experience richer and richer meanings. The dialectical process, which Hegel describes in the well-known triadic form of thesis-antithesis-synthesis, is an incessant process of crisis and re-composition, in which every reached goal is intrinsically destined to become a new thesis and, therefore, to be denied to achieve a richer meaning. From this point of view arises a new conception of relationship, no longer considered as a formal contact between two elements or two subjects, but as a real process of transforming the data of experience.

In this perspective, the famous figure of the *Phänomenologie des Geistes*, known as the master-slave dialectic (*Herrschaft und Knechtschaft*), is not only to be re-interpreted as a step in the development of objective spirit, but can also be taken as a metaphor of Education and therefore, also as a possible figure of a theory of education, finally, able to become an autonomous kind of knowledge and a real science: the master-servant dialectic, in fact, indirectly refers to a form of educational relationship, able to overcome, as such, all forms of absolute and predetermined identity.

Dewey starts from these assumptions, reconciling his youthful idealism with the suggestions of James (especially, the stream of consciousness) and the logical theses of Peirce so to arrive to a completely original thought.

His thought focuses on three pivotal themes: the fundamental role of the problem in the process of knowing; the value of intelligence method to deal with recurring crises in the development of human dynamic and open existence; the complexity human existence and experience. These three themes are closely connected, so that one cannot be explained without referring to the others and, at the same time, they re-interpret the dialectical principle, because all of them focus on “relationship”. The problem is the obstacle that the process meets in its developing; it is somehow a surprising element, which must be understood and overcome through the

⁹ Westbrook, R. B. *John Dewey and American Democracy*, Ithaca, Cornell University Press, 1991.

methodological intelligence approach: this approach imposes a mutual change in the parties involved in the process, hence, to re-orient and re-start the process of the experience and of existence. Beyond these ongoing, relations full of meaning, able to lead the history of humanity toward better conditions, no experience and no life are possible – neither generally nor individually.

In this regard, let us especially consider the aspect of dynamic complexity, a clear legacy of the Hegelian discourse and dialectics. Dewey interprets this complexity, since the beginnings of his instrumentalist approach, speaking of interaction and criticizing all the traditional dualisms of Philosophy (Mind-Body; subject-object; Intellect-sensitivity, Nature-Culture; Thought-Action). The holism at which he aims – always following his youthful idealism – urges him to see in the dualism of philosophy and Western culture a kind of original and deadly sin of the thinking activity.

This position, in whose name human experience (and, therefore, also the school) should be considered as a whole, is grounded on the interactions between seemingly different elements. Though it is recurrent in Dewey's works until his full maturity, at one point he judges this thesis insufficient. Then he proceeds a step further: the interaction among different elements, although it leads to mutual exchanges, is not able to reach the radical "reconstruction" of the world that for Dewey is the main purpose of every human conscious activity. So, he begins to speak of transaction, which, for Dewey, is a full and satisfying form of "communication".¹⁰ For co-operate is not enough, because it is necessary to share. We are beyond the Hegelian triadic process: synthesis denies thesis and antithesis, because includes them and makes them true; interactions reconcile the parties involved in the process, with a mutual change, but it always leaves a kind of diaphragm among them, because these elements still exist in their individual identity.

¹⁰ "He later substituted "transaction" for his earlier "interaction" to denote the relationship between organism and environment, since the former better suggested a dynamic interdependence between the two, and in a new introduction to *Experience and Nature*, never published during his lifetime, he offered the term "culture" as an alternative to "experience." Late in his career he attempted a more sweeping revision of philosophical terminology in *Knowing and the Known*, written in collaboration with Arthur F. Bentley" (Fieser, J. (founder and general editor), Dowden, B. (general editor), *Internet Encyclopedia of Philosophy*, (read on the 7th of April, 2016, at 3.28 p.m.)

The transaction is a step forward, referring both to the vision of the interaction and to the triadic Hegelian dialectics.¹¹ For it builds a new complex unit and a context fuller of meanings, thanks to which men understand to part of a whole and, therefore, a fragment of the whole meaning. This point of view considers man not as something radically opposed to a world around him, and neither as a subject simply acting in a world, but as the real action of the world and the world itself, of which the man is an integrating part.

Dewey moved from a particular observation of the world to the observation of the entire system; in the transaction he saw a new way to assert and to articulate his method of a creative intelligence, because transaction, more than interaction, can explain and show the intrinsic dynamism of existence, to remove any dogmatic and prejudicial claim and to make intelligible the complexity of experience, knowledge, history and, therefore, existence.

As I said, the most important work, in which Dewey describes this new phase of his philosophy is *Knowing and the known* – written with his disciple and friend Arthur Bentley and published in 1949, when Dewey was ninety. Dewey's pages do not deal with education, nor speak of pedagogy nor, as he preferred to say, Philosophy of education. It is clearly a work on epistemology, which takes into account Logic, Philosophy of Language and Philosophy of Science. Moreover, it is one of the most interesting but also one of the most difficult of Dewey's works. Nevertheless, I can assert that in these pages education is an implicit central topic; *How we Think* and *Logic* form a strong relation with education: in *How we Think* the author speaks of Education and Didactics, approaching Logic; in *Logic* and *Knowing and the known*, the main topics are logic and science, but Dewey reaches the heart of Education.

This thesis defends a clearly complex and secular *Weltanschauung*, for it does not accept any dualism and any “ultimate” truth or “absolute” knowledge. The conclusion is that human knowledge consists of actions and products of acts, in which

¹¹ Generally speaking, we can take into account some statements relating transaction is: – inquiry in which existing descriptions of events are accepted only as tentative and preliminary; – inquiry characterized by primary observation that may range across all subject matters that present themselves, and may proceed with freedom to re-determine and rename the objects comprised in the system; – Fact such that no one of the constituents can be adequately specified as apart from the specification of all the other constituents of the full subject matter; develops and widens the phases of knowledge, and broadens the system within the limits of observation and report; regards the extension in time to be comparable to the extension in space, so that “thing” is in action, and “action” is observable in things; assumes no pre-knowledge of either organism or environment alone as adequate, but requires their primary acceptance in a common system; the procedure which observes men talking and writing, using language and other representational activities to present their perceptions and manipulations. This permits a full treatment, descriptive and functional, of the whole process inclusive of all its contents, and with the newer techniques of inquiry required; relating to observation insists on the right to freely proceed to investigate any subject matter in whatever way seems appropriate, under reasonable hypothesis (see *Knowing and the Known*, Boston, Beacon Press, 1949, pp. 107–121, *passim*).

men and women participate with others men and women, but also with animals and plants, with objects, in any environment. However, men and women are vulnerable to error. Consequently, all knowledge, whether commonsensical or scientific, past, present, or future, is necessarily subject to further inquiry, examination, and revision.

Conclusion

I can assert that the process of revision and improvement of knowledge, as far as it also affects human nature and conduct, and the environment (on the grounds of the complexity characteristic to experience and existence) is the process itself of human education.

Therefore, with Deweyan transactional position, Education is enriched with an important theoretical matrix, which allows a view not only more complex but also more meaningful and epistemologically fruitful. From this perspective, in fact, education is not only a process changing individuals and social groups, but also and mainly a process of communicating and sharing, which is an ameliorative transformation itself, as far as it involves the growth of meaning of experience, continuous search of life sense, intelligence of the meaning and significance of human history and, therefore, the conquest of individual and civil responsibilities.

The process of Educational theory toward a scientific status reached the first phase of its conclusion: this is a new starting point. From practice to science; from science to epistemology.

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Kopsavilkums

Pētījumā aplūkotas četras filozofiskās un kultūras idejas (vēsture, daba, zināšanas un, visbeidzot, attiecības starp priekšmetu un objektu) periodā no Eiropas renesanses līdz 20. gadsimtam, sākot ar Makjavelli darbiem un beidzot ar Djūija loģiskās un izglītības idejām. Autore parāda, kā šie elementi un viņu mainīgā perspektīva ir ietekmējuši domāšanu izglītībā un soli pa solim veicinājuši tās emancipāciju no konformācijas uz sociālajām cerībām un no kopīgām morālajām vērtībām līdz epistemoloģiskam un zinātniskam stāvoklim.

Atslēgvārdi: izglītība, epistemoloģija, izglītības zinātne, izglītības vēsture.