**More Critical Thinking in Critical Thinking Concepts (?)**
**A Constructivist Point of View**

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**Abstract**

*The article raises the problem of critical thinking from a constructivist perspective. In the course of argumentation, we justify the thesis that constructivism is a valuable basis for both a theoretical approach (as a model) to critical thinking and a didactic design of activities focused on shaping and developing appropriate skills and dispositions. In our article, we point out that the advantage of the concept of critical thinking based on the constructivist model is mainly related to the assumptions underlying constructivism itself. Its application to the theory and practice of critical thinking implies important solutions, for the most part, on the epistemological and ethical level, while at the same time providing an attractive alternative to the concepts of critical thinking present in contemporary educational discourse.*

**Keywords:** *Critical Thinking, Constructivism Didactics, Educational Philosophy, Educational Theory*

**Introduction**

The issue of critical thinking is important for education, both in theory and in practice. It plays an important role, among other things, in analyses concerning educational goals and in designing methods leading to them. It is possible to

speak about an established trend of 'orientating' teachers to help their students develop the intellectual competence known as 'critical thinking' (CT). However, the popularity of CT is unmatched by its definitional clarity. There is no consensus among scholars about what CT 'ultimately' is. At the same time, literature on psychology, pedagogy, and sometimes also philosophy contains many different approaches, often burdened with too much generality and lack of precision. These usually consist in specifying a series of cognitive skills and dispositions (e.g. abstracting, generalizing, extrapolating, deducing, induction, open-mindedness), which form a certain conglomerate of competencies functioning under a common name – *critical thinking.* The declared special value of CT boils down to shaping the subjects of education in such a way that they become rational persons, i.e., among others, critical, self-critical, justifying their theses, noticing errors in their own and other persons' reasoning, and recognizing the distinguished role of scientific knowledge.

There is no established, uniform method of defining CT, nor is there any specific criterion or criteria that constitute the basis for determining the meaning scope of CT. In such a situation, different abilities, in different configurations, can be called critical thinking and can become a subject of education at the same time. This translates into a didactic way of thinking about creating a suitable environment in which students can acquire and practice this competence, which is difficult to grasp and complicated (from the perspective of teaching theory).

The definitional ambiguity of CT is an important reason for the difficulty in designing teaching situations that facilitate the acquisition of critical thinking skills. Simply listing the cognitive skills and dispositions required in CT is not enough to set educational standards that would enable the teacher to take a specific action. Without being embedded in a specific theoretical framework (in

a theoretical model[i]), they only provide a general context for teaching. It is only by establishing this framework that CT can be put into practice.

In this article, we accept that constructivism can be considered as a model for clarifying the understanding of CT and therefore for the teacher to take concrete steps. Applied to education, it takes the form of constructivist didactics. In general, constructivism itself comes down to two basic principles:

> (1) knowledge is not passively received but is actively built up by the cognitive subject
> (2) the function of cognition is to adapt to and to organize the empirical world, not to discover reality (von Glasersfeld, 1989, p. 162).

For education, these principles mean that learning, including learning by generating cognitive conflicts, takes the form of the student's research activity. In this way, a teaching situation does not consist of a simple cultural transmission but of, at least, a partial co-creation of the culture. The use of didactic tools, including mainly those aimed at group negotiation of meanings (e.g. discussion, deliberation), creates conditions for redefining previously held notions and categories, thus providing an opportunity to show different images of reality and bring them into a confrontation with each other, as well as to undermine and co-create socio-cultural conditions.

Constructivist didactics, in particular when it is tightly linked (both in theoretical and practical terms) to CT, may offer a useful tool for the realization of the core aims of critical pedagogy. Although the declared aim of constructivist didactics is not to implement changes at the level of social practices, the fact that it places an accent on attitudes that are reflective, skeptical, critical, and self-critical makes such changes possible. This is because

that a necessary condition for emancipation and related actions which aim to change the current, unaccepted educational reality or the broader social and political reality is both an understanding of its conventional, agreed-upon nature and its ability to analyze this reality and generate a rational justification for the proposed changes.

This article aims to analyze the concept of critical thinking in a constructivist context. We will argue in favor of a twofold type of thesis:

(i)     in the theoretical dimension – constructivism is an adequate theoretical framework (as a theoretical model) for the concept of critical thinking,

(ii)    in the practical dimension – constructivist didactics creates favorable conditions for supporting the development of the CT.

This means that (a) the CT concepts based on the constructivist model are more coherent, less dogmatic, and do not generate the same gravity of problems (e.g. ontological, ethical) as the CT concepts based on other models (modern concepts); (b) the constructivist model used for didactics enables the generation of practical guidelines that allow the implementation of the crucial CT skills and dispositions.

The article is divided into two main parts. In the first part, we present the problems of contemporary CT concepts. The remarks formulated in this section will be used in the second section, where we move on to the discussion of the CT issue in a constructivist model. In this section, we identify and analyze the problems (theoretical and practical) of contemporary approaches to CT from the constructivist perspective, discuss the basic assumptions of constructivism, and then indicate the theoretical advantage of the model advanced here over others and the benefits that result from the use of didactics based on the constructivist

model. The whole process ends with conclusions. Here, we summarise the earlier conducted analysis.

## 1. Characteristics of the concepts of critical thinking

As mentioned in the introduction, CT is an ambiguous concept. This means that we do not have a precise meaning that is universally agreed upon. There are many concepts of CT and each of these accentuates or introduces different meaningful components (Hitchcock 2018; Bailin, Case, Coombs & Daniels 1999a; Siegel 1988; Winch & Gingell 2002). At the same time, this does not mean that we do not have any general definition of this concept. However, it is so ambiguous that it allows for different interpretations of CT in different theoretical models (e.g. philosophical trends or educational paradigms). A necessary element of all CT concepts is the emphasis on the particular importance of meeting the standards of rationality, as CT 'is best thought of as an embodiment of the ideal of rationality' (Siegel 1980, p. 8). It is worth noting at this point that the very idea of CT is mainly within the domain of Western European culture.  This means that it was – and could only have been – created based on a way of thinking that appreciated values relating to truth and scientific knowledge. The importance of CT is not as great if we assume that a given culture puts supra-rational ways of explaining reality (e.g. religious), above the mentioned values.

## 1.1 Classic concepts of critical thinking

Historically, the first systematic concepts of CT are to be found in ancient times, especially in the philosophy of Socrates (Norris 2014; Hoaglund 1993; Boghossian 2006). His method of (elenctic) dialogue, based on questioning the opponent's beliefs (Vlastos 1991), was a practical realization of the ideal of rationality. We must not forget other classics of ancient philosophy such as

Plato and Aristotle, whose theory of knowledge as a system of true and reasoned beliefs successfully served as a theoretical basis for ideas (formulated later on) for rational thinking. Later, it is worth pointing to Descartes with his method of analysis as part of skeptical doubt, or F. Bacon with his concept of a scientific method (Hitchcock 2018). In the context of education, J. Locke played an important role. His essay, *An Essay Concerning Human Understanding* (1974), suggests a superstition-free teaching in which only claims based on credible justification are accepted. J. Dewey played an especially far-reaching role. His *How We Think* (1910), systematically presented the concept of reflective thinking and thus became a classic of contemporary theory and the initiator of the movement for education in critical thinking, not only in the United States but worldwide (Hitchcock 2018).

## 1.2. Contemporary concepts of critical thinking

At present CT issues are being taken up by many researchers coming from various fields of knowledge, Indeed, not only educational philosophers but also psychologists have taken up the banner (Sternberg 2007). The first wave of interest in this issue occurred in the middle of the 20th century (e.g. Black 1946; Ennis 1962). The importance of appropriate cognitive skills (including operational knowledge of the standards of good thinking) and background knowledge (factual and theoretical knowledge on the topic of the issue analyzed via critical thinking) is emphasized here. These skills include observing, experimenting, inferring, generalizing, conceiving, stating assumptions, identifying fallacious arguments, and evidence-based reasoning (Hitchcock 2018; Bailin et al. 1999b; Winch & Gingell 2002; Mason 2007). In general, and according to the reasoning of this time, a Critical Thinker is one who has and can apply operational and background knowledge to selected topics.

The second wave falls (conventionally) from the 1980s onwards. These theories additionally emphazise (apart from skills and background knowledge) the teleological, ethical and dispositional dimension of CT (Norris 2014); 'this shift in focus meant that critical thinking must be directed to finding both what is true and what is right' (Norris 2014, p. 198). This means that emphasis is placed not only on the importance of the ability to logically characterize a given topic and the knowledge about it (e.g. consistency and adequacy of the assumptions of a given belief system), but also upon the aim (ethically understood) of undertaking these cognitive actions, and what moral attitudes should be taken into account in CT education (Paul 1982; Siegel 1988; McPeck 2017; Martin 1992; Mason 2007).

The most frequently cited dispositions and attitudes important in this context include respect for reasons and truth, respect for high-quality intellectual product and performances, open-mindedness, fair-mindedness, independent-mindedness, respect for others, and intellectual work-ethics (Bailin et al. 1999a, p. 294-295). From the above emerges an image of CT that is also focused on practical-social and normative-moral dimensions:

> [...] it's not enough to teach students how to think critically and to expect them to be critical thinkers. In addition to the knowledge of principles and standards and to the skills of credibility assessment, making inferences, and analysing arguments, students need to acquire critical thinking dispositions [...] and the disposition to think critically when it is appropriate to do so (Norris 2014, p. 198).

For example, H. Siegel claims that in education, concerning CT, beyond skills development, i.e. teaching 'how reasons are assessed, what principles govern such assessment, and why (we think) such principles are adhered to' (Siegel 1980, p. 9), there is something he calls 'Critical Spirit.' This comes down to the

proper shaping of character that is consistent with, inter alia, willingness to conform judgement to principles and fair-mindedness. In other words, characters that are inclined to base judgements on reason (Siegel 1980, 1988; Mason 2007). Similarly, Martin, for whom the dispositions are morally grounded towards the change of the social world for the better (Martin 1992), and Mason (2007, p. 344), who, in his integrated concept, points to the many elements necessary for proper CT education, stress that beyond the skills of critical reasoning, a critical attitude, knowledge of the concept of critical reasoning and knowledge of a particular discipline is necessary. This also includes moral orientation.

The case is similarly presented in *The Delphi Report*, published in 1990 (Facione 1990).[ii] Divided into skills and dispositions, among the former, it mentions interpretation, analysis, evaluation, inference, explanation, and self-regulation. In turn, the required dispositions include, among others, trust in the process of reasoned inquiry, open-mindedness, fair-mindedness, honesty in facing one's biases stereotypes, egocentric and sociocentric tendencies, and prudence in suspending, making, or altering judgements.

CT understood in this way is clearly related to education, being one of its important objectives. Because education is a process of realization of internal and external goods, CT is to not only serve cognitive (and moral, also in the context of everyday life) development, (Alston, 2001)), it is also important in the field of civil society in the context of understanding one's own culture (Siegel 1988, p. 59-60), democratic development (Ghazinejad & Ruitenberg 2014) or interpersonal relations (Siegel 1988, p. 55-56).

On the one hand, the discourse on CT over the last few decades has therefore been dominated by the view that it no longer includes only the set of basic skills

of logical reasoning (and background knowledge), but additionally requires a certain minimum of moral dispositions to being a good citizen and a good person in general; a Critical Thinker is, therefore, one who not only has and can apply operational and background knowledge to selected topics, but also does so by being motivated by seeking the truth (Hitchcock 2018) and by following socio-ethically important norms. On the other hand, however, from the CT characteristics cited above and the attempt to standardise the CT approach contained in *The Delphi Report*, there is still no clear picture of what it is. This is due to the fact that these characteristics and attempts at standardization are relatively different in terms of (a) the number of skills and dispositions but also (b) the interpretation of basic concepts, especially those normatively involved, which are important elements in CT concepts.

## 2. Analysis of contemporary concepts of critical thinking from the perspective of constructivism

In accordance with the thesis put forward in this article, we assume that constructivism is a valuable basis for fabricating concepts and designing practical measures related to CT. The advantage of CT concepts based on the constructivist model over concepts based on other models is mainly due to the assumptions underlying constructivism itself. Its application to CT theory and practice is associated with anti-dogmatism, relatively high internal cohesion, and minimalism in terms of ontological and ethical solutions. These constitute an attractive alternative to CT concepts present in contemporary discourse. Below, we will point to selected problematic (due to their strong philosophical assumptions) properties of non-constructive CT concepts that weaken their value. Next, while sketching a constructivist model, we will try to show the high potential of this that is contained both in the theoretical and practical-educational dimensions within the CT field.

## 2.1. Selected problems of the concepts of critical thinking in the perspective of constructivism

The criticism of contemporary CT, apart from the ideological, which is based on the claim about the threat posed by the critical judgement of some fundamental, e.g. religious, principles (Siegel 1988, p. 48), concerns philosophical and pragmatic (including moral) issues. Among the issues stressed here (Hitchcock 2018) are orientation to thought over orientation to action (Martin 1992); distancing from the object over closeness to it (Martin 1992; Thayer-Bacon 1992); reason over emotion and solitary thinking over collaborative thinking (Thayer-Bacon 2000). The constructivist criticism and proposal also have a philosophical and pragmatic dimension, but they emphasize the assumptions underlying the CT concepts to a greater extent.

Contemporary CT concepts treat the idea of critical thinking broadly. CT is not just about thinking and acting, but about the 'right' thinking and acting, also in an ethical sense. Thus, they imply many philosophically engaging issues on which there is no final consensus in the philosophical discourse; one may speak about, for example, confronting beliefs with facts, referring to observations, the search for truth, and evidence-based reasoning. It presupposes a common-sense but philosophically debatable recognition of 'pure facts', truth as correspondence or adequacy of human perception. The language of contemporary CT concepts is close to metaphysical (and epistemological) realism. According to the indicated manner of thinking, some universally understood standards allow for recognizing beliefs and actions as 'right'. However, this would not have been possible without recourse to some external criteria – independent of the model, as well as facts, which in this sense, are understood as untheorized states of affairs. Contemporary approaches to CT, inscribing themselves into the narrative of 'strong' objectivism, inherit some of the problems of metaphysical realism. Such a stand is rejected both by anti-

realism and constructivism, in which (apart from principles of logic), it is highly problematic to talk about facts, pure observations, truth, knowledge, etc., outside of any model.

It should be stressed that this is not only a matter of accepted optics, which can be reduced to, from the point of view of pedagogical theory and practice, a strictly philosophical dispute over theoretical foundations. Apart from important presuppositions, which themselves require justification and at the same time generate various problems (e.g. difficulties resulting from the metaphysical and epistemological assumptions of the correspondence concept of truth, knowledge understood as a true and justified belief, and, above all, as an epistemically unclear category of reality that is usually justified by reference to the common-sense belief of the existence of the world itself), the adopted models of description imply consequences important for the educational practice.

A school application of realism entails concrete implications that are usually unknowingly served up in a very simplified form. The consequence is a *sui generis* realistic worldview, which often influences the formation of an unwavering belief in the idea of progressive, linear, and rational development of the idea of science that is most often incomprehensible. The belief that we live in a world which, being ontically independent from all cognitive acts (metaphysical thesis) and at the same time both epistemically accessible (epistemological thesis) and categorizable (semantic thesis), often leads to the uncritical recognition that the task of science is to provide a reliable (i.e., one which discovers the world's genuine nature) description of reality.

The belief in objectivity and reliability of science is built on the methodology of naive inductionism (which plays an important role in modern CT concepts). It is accompanied by the belief that observations and inductive reasoning are

objective in themselves, which means that they are verifiable (so-called observation sentences can be confirmed or disproved by every observer who has 'normal senses'). The reliability of scientific theories results from the above-mentioned possibility of verification and possible confirmation of their truthfulness (*cf.* Chalmers, 1999).

Such a simplified vision of learning, combined with the lack of space for dialogue and confrontation of views that frequently occurs in educational practice, is one of the reasons why formal education takes the form of pre-planned and thus didactically 'rigid' lessons, which consist not so much of asking open questions or considering available and potential solutions to known or possible scientific problems and issues, as of reproducing well-established reasoning strategies and assimilating 'prepared' knowledge. Long-term formal education sometimes permanently shapes our attitude to science, education, and what we call the world. Under its influence, we begin to believe that there is one universal and static description of reality. To some extent, this causes the school to perpetuate the existing belief system.[iii]

From a constructivist point of view, there is no consent for such a positivist understanding of science, within which no paradigmatic disputes are seen (cf. Kuhn, 1962), nor to education perceived as a simple transmission of existing knowledge. One may refer here to the well-known postulate of Paul Feyerabend's methodological anarchism (1975), for which the principle of *anything goes* is one of the fundamental principles for the freedom of thinking and practizing science. Using this principle, constructivist didactics emphasizes a skeptical attitude towards existing knowledge and the freedom to formulate and solve problems, even when it requires the undermining of existing norms and rules (socio-cultural, methodological, etc.).

## 2.2. Constructivism and its implications for the concepts of critical thinking

Given the assumption that knowledge is a kind of construct (and therefore something that is produced through individual cognition using existing cultural tools accessible to the individual, especially language), all categories essential for epistemology, such as 'truth', 'knowledge', 'rationality', cease to be perceived through the prism of the positivist paradigm, and at the same time constitute a radical break with the traditional, objective theory of cognition (Glasersfeld, 2007).[iv]

The knowledge that forms the basis of the scientific picture of reality cannot be understood in constructivism as a representation of 'what is outside', which stems from a clear negation of the concept of the existence of a metaphysical correspondence between language and the reality to which it is supposed to refer (cf. the anti-realism proclaimed, among others, by R. Rorty, 1989, 1991; H. Putnam, 1987). It is possible to create models of reality; however, their reliability is not based on the aforementioned relationship of correspondence but is constituted by the criterion of clarity and simplicity of the description developed, as well as its coherence and scientific usefulness. Such a point of view means the acceptance of the thesis that the cognition of *reality* is achieved by constructing models that have an operational function and help to cope 'as best as possible' with the existing surroundings.

That which emerges from the constructivist perspective is not only anti-metaphysicism and relativism, but also the assumption that the changing living environment forces the individual (and groups) to modify their behavior, sometimes temporarily and sometimes permanently by the need to adopt completely new, non-standard actions that force the use of different (concerning to the previously used) thinking strategies. These strategies are the result of learning. A constructivist assumes that knowledge is actively built by the

cognitive subject, while cognition, and at the same time learning, enables the organization of the experienced world. The constructivist teacher will focus on supporting and developing the student's understanding of the reality experienced by the student through the phenomenon of mental manipulation of existing cognitive structures that form a conceptual cognitive system. Formal education, above all, should not block the natural process of acquiring knowledge, rather it should be organizing the educational environment in such a way that it is conducive to the construction of new and increasingly complex conceptual structures for students. This can be achieved by creating qualitatively new and culturally multifaceted situations in which individual development is realized.

Science and knowledge are not, therefore, a tool for unifying thinking within the imposed paradigm but are inscribed in the logic of an open, seeking mind. With the acceptance of constructivist didactics, a specific (by traditional education standards) approach to goals and contents present in the educational process (in which the role of a pupil is active and that of a teacher is relatively passive), and above all two basic assumptions of such an approach to didactics, becomes visible: (a) epistemological, which boils down to the claim that knowledge is a construct, i.e. something that is created, not discovered, and therefore fully dependent on our ability to think abstractly and creatively,  and (b) practical, according to which the 'constructivist-based' practice is not a theory of teaching, but a theory about learning. In this aspect, the influence of didactics constructivistically-oriented on an individualized, critical-analytical and at the same time, creative approach to education is manifested.

Of the above, the initial and most important is the epistemological assumption (knowledge is a construct) that, together with the negation of epistemological realism, limits the penetration into the educational theories of epistemological

absolutism and axiological (including moral) universalism. Such an approach allows for changing (concerning the traditional concept of education) the relationship between 'learning and teaching', thus influencing the already mentioned aspects (first of all, the active and in some moments even dominant role of the student in the broadly understood educational process) of constructivist education.

In terms of philosophical assumptions (e.g. ontological, epistemological, ethical) the constructivist perspective is minimalist. The constructivist approach to CT does not solve the problem of the realistic approach (and realism in general) but indicates its problematic character. In this way, it is a more in-depth approach to CT that is in line with the assumptions of CT. Constructivism does not accept a particular ontology in advance, but suggests an additional analysis, namely that facts, truth, observations are not established once and for all, but that they, and not only verified beliefs, are also burdened with specific assumptions. Constructivism, thus, proposes a longer path than contemporary CT theories – it requires considering the theoretical loads of the method of analysis adopted in CT. A person educated in the CT model understands that the methods they adopt, for example, of assessing the reliability of beliefs, are not free from important philosophical assumptions.

The same is true of the dispositions identified in the contemporary CT theories. There are socially and morally important demands placed on CT. In general, it is about thinking and acting not only for one's own good but also for the social good. The concepts that appear in this context are mainly those related to a non-egoistic attitude, free from stereotypes, acting in accordance with moral principles, fair and open-minded (Norris 2014; Phelan 2001; Facione 1990; Martin 1992; Mason 2007).

This ethical commitment can also be seen in the attempts to justify the social validity of CT in education (Siegel 1988). It is not about criticizing the social validity of non-egoistic attitudes or being fair-minded but is about the very assumption that these are principles that do not require justification (or at least explanation). The values indicated above are the moral standard that is to determine the direction of CT education. Constructivism suggests that, despite the common sense of these principles, they can be the subject of analysis. They are not objectively existing entities (e.g. based on Platonic ideas), but are constructs that were created in response to evolutionary human needs (cf. de Wall, 2014; Tomasello, 1999). The above dispositions are at the semantic level, normative concepts, and, therefore, every attempt at their operationalization encounters the problem of choosing a normative system in the context of which they should take on a certain meaning. The distinction between them as implicitly universal principles, for which no justification (or explanation) is required, presupposes a realistic vision of morality, at least in relation to these principles. Constructivism recognizes that they are constructs and, as such, should be subject to reflection.

The problem of contemporary CT concepts stems, from, among other sources, the mix up of intellectual and moral virtues (Mulnix 2013):

> critical thinking as an intellectual virtue is not directed at any specific moral ends. [...] For instance, two critical thinkers can come to hold contrary beliefs despite each applying the skills associated with critical thinking well and honesty. As such, critical thinking has little to do with what we think, but everything to do with how we think (Mulnix 2013, p. 466).

Some theorists (see for example Phelan 2001) offer practical wisdom as a better alternative to CT. However, such a proposal further exacerbates the above-mentioned problems. Practical wisdom (phronesis), which was first formulated

in a systematic form by Aristotle (2002), is a disposition to act based on a morally specific goal (what is good for humanity). It engages us in a matter of moral good. As a metaphysical realist, Aristotle considered theoretical contemplation to be the highest good, which he justified by referring to the form (function) of humanity. Even if someone does not adopt such a position, some concept of goodness must be adopted. Yet, such a moral horizon in any education, as long as it is not subject to reflection, can be considered as an attempt at indoctrination; CT education as practical wisdom would ultimately be an attempt to establish moral standards outside the subject being educated, and this idea is contrary not only to constructivism but also to the principles of teaching in general (it does not lead to the internalization of these moral standards). The recognition of CT as practical wisdom can additionally lead to consequences contradictory to CT. One needs only imagine the ideological interpretation of the ultimate goal, and then CT can become a tool in the hands of ideologists.

What, then, does constructivism propose? It certainly does not reject the importance of learning the principles of logic (including informal logic), and, therefore, it does not reject shaping cognitive skills - and, in principle, it is the shaping of skills that forms the basis for education for CT. CT in constructivism is not so much a cognitive attitude as a meta-cognitive one. Hence, the educated subject should know the basic principles of logic and be able to apply them. Therefore, everything related to the standards of correct reasoning, justification, and verification of statements, defining key concepts in some perspective, identification of erroneous definitions, distinguishing different types of discourses (e.g. descriptive and normative), and identification of contradictions in belief systems will be important here. Consistent constructivism, however, additionally requires the adoption of a meta-cognitive attitude towards the tools of analysis used by the judging subject. They should be aware, at least in part,

that its standards are burdened with assumptions that ultimately affect the shape of the conclusions, including the problem of theorizing of what they consider to be facts and of what definitions they adopt or the fact itself of the selection of the problem for critical analysis.

CT in a constructivist interpretation is, thus, closer to the first wave of CT theory, where the emphasis was placed precisely on cognitive skills. As for the dispositions, especially of those involved in normativity, constructivism, as presented here, accepts the claim of unauthorized mixing up cognitive skills with socially-morally engaged dispositions. The inclusion of the latter in CT generates problems that are incompatible with the very idea of CT, because what is supposed to be justified and proven, namely some culturally established moral values, is assumed. Constructivism leaves all socio-moral issues to moral education. Herein, CT should play an important role. These moral issues can and should be the subject of the Critical Thinker's analysis, i.e. the area where they use the cognitive tools of CT. Moral choices are, however, left to the individuals themselves.

Constructivism, hence, assigns adequate tasks to education for CT, i.e. those which in any education for CT seem to be crucial (education of a distanced, critical and self-critical attitude, emphasizing the contextuality of knowledge and self-knowledge), leading to it not taking either side of emerging moral dilemmas, i.e. leaving moral choices to the educated subjects themselves. The shaping of social and moral dispositions is not intended, but it may appear as a secondary effect of CT. An attempt to find historical analogies of constructivist and skills-based concepts of CT makes us recall, first of all, Socrates' dialectic method, sometimes misunderstood as a method of extracting true knowledge. However, it is problematic to attribute a specific metaphysical position to Socrates. It is only in Plato's *Late Dialogues* that we can speak of a specific

position (Vlastos 1991), as they contain the thoughts of Plato himself. Therefore, Socrates focuses mainly on undermining beliefs by pointing out contradictions, counterintuitive consequences of assumed beliefs, or inconsistencies of expressions used with language conventions. Thus, he uses selected informal logic and irony tools to achieve the effect of recognizing the shortcomings in his knowledge. This leads to a secondary disposition of epistemic humility.

Constructivist education needs to organize an environment in which the learner is confronted with problematic situations. The consequence of this is cognitive dissonance solved through independent intellectual effort, using conceptual structures available to the student. This arrangement influences the development and modification of current conceptual structures (Glasersfeld, Cobb 1983). The central point is the reliable, analytical intellectual activity of the student that is to lead to effective and targeted actions. Tomasello clearly indicates that it is precisely the individual who perceives, understands, and categorizes their cognition expressed in language. This, in the process of ontogenesis, leads to more effective and more abstract cognitive systems (Tomassello, 1999).

The fundamental question is to what extent can formal education support this largely natural process of individual development. Constructivist didactics assumes that it is impossible to teach someone something. Learning is a kind of mental activity and always involves a mental construction process. Therefore, it is not possible to ensure that a student who does not have adequate intellectual resources can begin to use complex conceptual schemes by abstracting, synthesizing, extrapolating, and reliably evaluating the information provided, etc. Upon understanding the cognitive and didactic role of CT, it is no longer difficult to link learning with the research process. J. Dewey, who included five logically different degrees of investigation into knowledge, based his work on such a foundation: 1) a felt difficulty, 2) its location and definition, 3)

suggestion of possible solution, 4) development by the reasoning of the bearings of the suggestion, 5) further observation and experiment leading to its acceptance or rejection; that is, the conclusion of belief or disbelief (Dewey, 1910, p. 72).

An example of an activity that makes good use of a student's cognitive potential (inducing them to ask questions, to discover previously unknown aspects of the surrounding world, and finally to contest the knowledge known to them) may be a scheme of action for a constructivist teacher for whom the primary goal is to provoke the student to act by solving a problem posed to them. The scheme comprises four procedural stages:

(i) orientation, the aim of which is to obtain information about the student's pre-knowledge,

(ii) involving students in the work on their own notions, already existing ideas, etc.,

(iii) reorganization and application for the student's knowledge-building process. Knowing that reorganization of ideas depends on the learner, the teacher actively supports the creation of new ideas among students, provoking them to exchange their views and ideas. Revealing incompatibilities in the thinking of students provoke, in turn, the questioning of particular perspectives. This stage of work with students is extended by testing through discussion or by means of a student-designed experiment, etc., the theory, thesis, or explanation they have formulated. This makes it possible to verify and correct the theory proposed earlier,

(iv) review changes in student concepts, as well as compare current thinking with previous thinking (Scott, Dyson, Gaber, 1987).

It would not be possible for a student to complete all the stages mentioned above, from the formulation of a problem to its solution, without the ability to analyze, synthesize or assess, using at least the basic logical tools of the previously developed models. Also not without significance is the very knowledge that the student acquires during the process of reaching a solution. Having a problem ahead of them, the student reaches for their memory resources, in which, with sufficient knowledge, they find a matrix of actions reflecting a problem analogous to the one encountered. Thanks to the possibility of reproducing in memory the scheme of operations undertaken during the solution of a known problem, the student can identify the proper structure of the new problem by efficiently formulating a solution. Such an approach allows the teacher to more effectively interest students in the problem, or to construct with them a problem situation for use in subsequent analyses, discussions, searches for solutions, and evaluation of them. All this is conducive to the creation of a specific culture of research, based on focusing didactic activities on the so-called great ideas that allow for in-depth studies that are related to the need to provide didactic materials supporting the broad intellectual development of students (Cunningham D. D., 2006). The idea of constructivist didactics, within which the development of critical thinking becomes something completely natural and not formally forced, is well expressed by the characteristics of a classroom expressed in the words of Catherine Twomey Fosnot:

> Classrooms soon became workshops, with teachers as facilitators, rather than transmitters of knowledge. The role of questioning, disequilibrium, learners paraphrasing each other and discussing ideas in learning communities, the importance of think time and pair talk, and the role of problem-solving and inquiry all began to be descriptive of the 'new' classroom (Fosnot, 2005).

**Conclusions**

There is no doubt that CT should become a fundamental element of education at every level of learning. The level of advancement of abstract thinking of pupils and students (which is mainly related to their age and acquired competencies) would influence the teacher-designed complexity of problems solved by pupils and students. The acquisition of CT competencies should, therefore, be made dependent only on the cognitive and developmental differences between students and should be an obligatory element of school and academic education. There is a rich base of educational methods (e.g. Socratic dialogue, problem based-learning, simulation method, situational method), with the use of which it is possible to successfully create appropriate conditions for the formation of new and already acquired CT skills.

The constructivist perspective, due to its anti-realistic foundation, is minimalist. This means that it avoids fundamental and philosophically troublesome assumptions concerning the world (ontological realism), cognition (epistemological realism), and values (axiological realism). Thus, education in the spirit of CT is a value in and of itself, without the need to determine the necessary initial conditions, e.g. in the form of ontological and/or axiological presuppositions. From the perspective of CT, it is beneficial for the student to be aware of the theoretical consolidation of their own and others' views, and at the same time to be able to analyse and criticize them. A person educated using the CT model should understand that every point of view is always theorized, as are the methods they adopt to assess the credibility of beliefs.

From this point of view, ethical and social issues present themselves in a slightly different way. Although they are not 'faced' with CT (as is the case with modern CT concepts), they are not overlooked either. On the contrary, they are particularly exposed, becoming a subject of discussion and rational argumentation, e.g. by means of an advanced form of deliberation (cf. Rawls,

1971), in which socially and morally important requirements are assessed against CT criteria. In this way, constructivism does not deprive itself of the possibility of moral education, but rather, through discussion, it improves the understanding of complex ethical issues that are often detached from individual experience. Avoiding the fundamental message of social attitudes, allows for the development of a rational form of their internalization.

Concerning the socially engaged conceptions of education such as critical pedagogy, the minimalism of the model present here may appear problematic. Although CT encourages openness to diversity and difference (for instance, of worldview, of political viewpoints, of religious or sexual identity, etc.) it lacks elements aimed at social change, with politically and socially transformative aspects. On the one hand, this may seem to be a limitation of the model (as it is simply a cognitive tool, one which serves no specific social or political aim), while on the other hand, the analysis of a defined social reality results in a critique and thus change. Understood in this way, CT can unmask the coercive aspects (usually in the realm of symbols), so significant for critical pedagogy, of the culture of school, and of the knowledge transferred to students there which reproduce the existing social order. To break through the domination of for example neo-liberal ideology implemented in educational policy requires grassroots work with those who appear most susceptible to the coercive influence of this culture. Schools, by operating in a partially repressive way (in the symbolic aspect), construct a dominant narrative, simultaneously excluding contradictory discourse.[v] Paradoxically, these schools may also become areas of resistance and cradles of the creation of alternative subcultures (Giroux 1983). The point is for this resistance to be a conscious reaction to the identified ideological narrative which is being forced on students by the social order, and for schools to have effective tools which may lead to changes in thinking, and subsequently to changes at the level of social practice. The model of CT which

has been presented in this article comprises an appropriate tool for analysis and critique of the prevailing *status quo*, regardless of whether this concerns academic issues or the existing social and political order.

## Notes

[i] The theoretical model is understood here as a system of assumptions, concepts and relations for a given object that between them describe and explain this object. In this way, it may be stated, as we do in the article, that constructivism may be considered an adequate model for the CT concept.

[ii] This report is based on a study using the Delphi Method, which, in short, boils down to an attempt by the researchers dealing with a particular problem to reach a consensus on a given issue. In the case of CT, these researchers (mainly philosophers, education theorists and social scientists) sought a consensus statement regarding CT and the ideal critical thinker. The *Delphi Report* is based on research conducted between 1988 and 1989. It is worth adding at this point that the consensus that was worked out still remains one of the options for understanding CT, namely (a) it is in partial opposition to the so-called first wave of defining CT, and (b) it is also not fully in line – in terms of the number and interpretation of skills and dispositions – with the proposals formulated by some representatives of the second wave.

[iii] It is the root of the intellectual incapability to transgress the limit of understanding of what *science*, produced by its *knowledge*, and even *reality* itself really is (Moroz, 2015).

[iv] Constructivism (being an epistemological anti-realism) assumes in turn, that *truth*, *knowledge, goodness* (like other epistemic, ethical, etc. values) are a kind of theoretical construct that acquires a certain meaning only in a given theory. This type of approach is implied by conceptual relativism (cf. Hilary Putnam, 1987; Richard Rorty, 1989, 1991; Nelson Goodman, 1978) according to which we can say nothing about the 'world itself', and even that the category itself is completely incomprehensible, while the notion of 'object' acquires meaning only in a specific conceptual arrangement. Thus, there is no single differentiated reality, we can speak of a multitude of worlds whose existence depends on the conceptualisation adopted. Constructivist didactics are part of this kind of narrative, which results in a non-dogmatic approach to education.

[v] „[...] education serves to complement, regiment, and replicate the dominant-subordinate nature of class relations upon which capitalism depends, the labor-capital relation. Education services the capitalist economy, thought this servicing is unproblematic or uncontested. Education (schools, universities) helps reproduce the necessery social, political, ideological and economic conditions for capitalism, and therefore, helps reflect and reproduce organic inequalities of capitalism originating in the relations of production". (Hill, 2013, p. 6)

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