

The universal, particular, and singular in the number concept in the Study Activity¹

O universal, particular e singular no conceito de número na Atividade de Estudo

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ABSTRACT

This text is an excerpt from the dissertation entitled: *Lógicas formal e dialética em sistemas de ensino de matemática*. In this sense, it shares the objective of manifesting the elements of logic that mediate the Elkonin-Davíдов teaching system, in this specific article, the category of the dialectic called universal, particular and singular. This objective can be translated according to the following question: How is the category of the universal, particular and singular manifested in the concept of number in the Study Activity? In order to develop an answer to this problem, the text progresses according to the following sections: 1 Introduction; 2 The universal, particular and singular in the concept of circulation of goods; 3 The concept of number in the Study Activity; and 4 The final considerations. At the end of the text, we demonstrate an analysis of the concept of number, presented in the Elkonin-Davíдов system, based on the dialectical category called universal, particular and singular.

Keywords: Dialectical Logic; Elkonin-Davíдов System; Developmental Teaching.

RESUMO

Este texto é um recorte da dissertação de título: *Lógicas formal e dialética em sistemas de ensino de matemática*. Nesse sentido, ele compartilha do objetivo de manifestar os elementos da lógica que medeiam o sistema de ensino de Elkonin-Davíдов, neste artigo em específico, a categoria da dialética dita universal, particular e singular. Tal objetivo pode ser traduzido conforme a seguinte questão: como se manifesta a categoria do universal, particular e singular no conceito de número na Atividade de Estudo? Para desenvolver uma resposta ante esta problemática, o texto progride conforme as seções: 1 Introdução; 2 O universal, particular e singular no conceito de circulação de mercadorias; 3 O conceito de número na Atividade de Estudo; e, 4 Considerações finais. Ao fim do texto, demonstra-se uma análise do conceito de número, apresentado no sistema Elkonin-Davíдов, embasada na categoria dialética dita universal, particular e singular.

Palavras-chave: Lógica Dialética; Sistema Elkonin-Davíдов; Ensino Desenvolvimental.

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1 Introduction

This text is an excerpt from the dissertation entitled: *Lógicas formal e dialética em sistemas de ensino de matemática*. In this sense, it shares the objective of manifesting the elements of logic that mediate the Elkonin-Davíдов teaching system, in this specific article, the category of the dialectic called universal, particular and singular.

For some time now, it has been understood that every education system is based on certain assumptions that come from a variety of conceptions of: society, knowledge, individual etc. With the Elkonin-Davíдов teaching system there is no difference, in fact it is admitted by Davíдов (1988, p. 5, our translation), when commenting on his book: *La enseñanza escolar y el desarrollo psíquico*⁴, that “to link the exam of psychopedagogical problems of developmental school teaching with the conceptual apparatus of dialectics is the inner purpose of our work”. At another point, the author also recognizes the importance of such a link between the education system and the conceptual elements of the dialectical logic: “without the capacity to distinguish the universal-particular-singular [...] when one says to set study tasks for students, one is actually setting imaginary tasks.” (DAVIDOV, 2019, p. 263, our translation).

However, when dealing with dialectics both its categories are of superior rigor for comprehension of the objects from reality and it is challenging to use them to understand the Thing under study. Therefore, this text seeks to answer the following question: How is the category of the universal, particular and singular manifested in the concept of number in the Study Activity?

Thus, this article progresses according to the following sections, in addition to this introduction: *2 The universal, particular and singular in the concept of circulation of commodities*, in which the category develops according to Hegel's doctrines⁵ and, in sequence, according to what was exposed by Corrêa (2021), the category is used to understand the concept of circulation of commodities – in order to give materiality to the application of

⁴ Translated from Russian to Spanish.

⁵ *Ciência da lógica: 1 a doutrina do ser* (HEGEL, 2016), *Ciência da lógica: 2 a doutrina da essência* (HEGEL, 2017), and *Ciência da lógica: 3 a doutrina do conceito* (HEGEL, 2018).

the category; 3 *The concept of number in the Study Activity*, moment in which the structure in actions of the Study Activity is exposed and an analysis is made from the example that Davídov (1988) presents in his book right after exposing the Study Activity, thereby, with the aim of manifesting the dialectical category of the universal, particular and singular in the example of Davídov (1988); and, 4 *Final considerations*, section in which the conclusions that arise from the development of the text will be highlighted.

2 The universal, particular and singular in the concept of circulation of commodities

Different from concepts based on formal logic, which resemble common names – not own –, in dialectical logic they overcome such quality. This superior conceptualization is precisely the object of the category discussed here.

In the first book of Hegel's logical system, *Science Of Logic: the doctrine of being*, the passage of indeterminate being occurs – identical, in content, to nothing – to the determined being, which means the existing. The main categories that develop the being are: quality and quantity. As soon as the being exists and, therefore, is determined, it manifests itself with specific qualities that differentiate it from others. According to the author, “through its quality, something is, in front of another, is changeable and finite, not only in front of each other, but determined purely and simply in a negative way in it” (HEGEL, 2016, p. 109, our translation).

However, with the qualification of the finiteness of existing beings, therefore, “if the quality makes the being something unique, it also makes it something identical to other beings of the same type, with the same quality that is, it makes it something multiple” (CORRÊA, 2021, p. 226, our translation), what is the genesis of new quantitative determinations.

While the being was determined qualitatively, through difference in relation to others, quantitatively it is determined through equality imposed by quality. However, such category requires a standard to quantify. This implies a qualitative difference within the quantity itself, to know: the measured and the unit of measurement.

The relation between quality and quantity, established in being, progresses until its determination in appearance that, logically, puts another substrate to which appearance is relative. Nevertheless, upon entering this new sphere, the peculiar immediacy of determined being is constrained and being surpasses the degree of abstract universal⁶.

Therefore, in the doctrine of essence, one enters the sphere of mediation. Thus, the being, through mediation, becomes appearance, which puts a new aspect on the being, the essence. That way, “appearance is the negative that a being has, but in another, in its denial.” (HEGEL, 2017, p. 41, our translation). At this stage, the being does not determine itself by the internalization of the negation of other beings, in fact, it determines itself internally between its appearance and its essence in a reflexive way.

Appearance, at first, seems to deceive the truth of being, as it must be found in its essence, which gives appearance a characteristic of contingency. This characteristic sometimes implies a rupture between the being and its essence. However, as Corrêa analyzes (2021, p. 234, our translation), “[...] To know the essence of immediate being, it itself has to appear in some way, that is, it has to be mediated by our knowledge of appearance”. In other words, otherwise, in a complete separation between appearance and essence, the latter is constituted in another immediate being, in which knowledge does not progress via mediation, in the same way as what occurs in the previous sphere, in the doctrine of being.

Thus, the essence – which contains the essential –, through appearance, should appear, what emulates a dynamic between identity of both categories, which has the same content, whose difference is that one is immediate and the other mediated. Since appearance is, in itself, of an essence, then it itself is part of the totality of the essence. Such reflective movement takes place as a interpenetration of opposites internal to being, that is, the engine that makes the entire doctrine of essence progress towards

⁶ Abstract universal, determined universal and concrete universal are degrees of conceptualization of the being until becoming concept.

the unity of substance, that is, the Thing in reality. Hegel (2017, p. 219, our translation) says “this identity of being within its negation with itself is now substance. It is this unity as within its negation or as within contingency, thus, it is the substance as a relation to itself.”

The substance realized in reality, in unity between appearance and essence, has all the properties of the real, for example, of being knowable. However, to know it objectively, it is necessary to reproduce it as a subject who knows himself. To Hegel (1992, p. 29, our translation), “everything comes from understanding and expressing the true not as a substance, but also, precisely, as a subject”. In other words, while the knowable substance is not known, it itself is not yet a subject, therefore, it is incomplete. Thus, “There is, therefore, something in the substance that goes beyond its immediate effectiveness. And the unity of the relation between what is in the actual substance and what is potential, between what is objective and subjective, is its concept.” (CORRÊA, 2021, p. 236-237, our translation).

In view of the manifesto, it is worth looking at the doctrine of the concept. In this last sphere, everything is both immediate and mediated, therefore, it is said to be speculative. This meaning is necessary, because even if the concept is concrete, by overcoming all the mediating determinations of being and essence, what is determined also has immediacy, without mediations. For example, from the immediate point of view, capitalist society expresses individual freedom, as mediated it is essentially exploitative, so in that unity it is speculative.

The substance, when known as a subject, through the scholar who knows it, acquires the form of a concept. In summary, “[...] the essence came from being and the concept came from the essence, with that, it also came from being.” (HEGEL, 2018, p. 66, our translation).

Therefore, one can understand Hegel's statement (2018, p. 59) of “[...] the concept appears as the unity of being and essence”. About this, Corrêa (2021, p. 241-242) says:

[...] the concept was always there in itself, it was Always a unity between being and essence; but only through going from the abstract to the concrete, can we understand the meaning of these categories. So, within the concept, the being and the essence no longer present themselves simply as being and essence, and, as a consequence, gain more determinations. [...] When we started with the being, this was an indeterminate; as we advance to the essence, the being gained the determination of appearance. Now, being and essence compose a relation between universal, particular and singular with the concept.

Thus, the relation between universal, particular and singular determines the content of the concept. In an immediate moment, at the beginning of the process of knowing, the concept appears as an abstract universal and, thereby, “it differs little from the immediate categories of the sphere of the being”, such as quality and quantity. “The universal appearance that the concept initially takes on is precisely what hides the fact that it is something determined.” (CORRÊA, 2021, p. 242, our translation)

In front of such an abstract universal, it is necessary to develop the category of appearance and, consequently, launch into the search for the category of essence. This attitude implies denying the immediacy of the universal by unveiling the moment of mediation of the concept, which reveals a new form submerged in the abstract universal, that which is the determined universal. Both forms, although different, essentially have the same content as they are the same substance. “The particular contains universality, which constitutes its substance; the gender is unchanged in its species; species are not diverse from the universal, but only from each other”. Therefore, “the particular has with the other particulars, with which it relates, one and the same universality. At the same time, their diversity, due to their identity with the universal, is as such universal; is a totality.” (HEGEL, 2018, p. 71, our translation).

In this way, the abstract universal acquires an opposite, that is, the determined universal, which particularizes the abstract while positing itself as a particular. Thus, all the determinations of the totality represent each of the forms among the particulars, while, from the totality itself they owe the category that dissolves the multiplicity of determinations and encompasses the opposites,

immediate and mediated – the singular, which is speculative. In other words, since part of the abstract and indeterminate universality is denied, the particular induces the concept to more concrete determinations. Therefore, it is said that the particular is the middle-term between the abstract universal and the concrete. “The singular emerges as an inevitable consequence of the subsequent determination of the particular.” (CORRÊA, 2021, p. 243, our translation).

Therefore, one should not abstract from this dynamic an infinite list in which a successor is more concrete in relation to a predecessor, as the difference between the singular and the particular is not just one of order, on the contrary, it is qualitative. The singular denies this abstraction, it is the concrete universal, the unity between the universal and the particular. To Hegel (2018, p. 86, our translation), when “[...]the unity of the concept elevates the concrete to universality, but apprehends the universal only as a determined universality, so precisely this is the singularity, which resulted as the determinateness that relates to itself.” Therefore, the singular operates the negation of the negation that forms the concept, the form of the absolute content.

Furthermore, Corrêa (2021) organizes some examples that are equally important to explain here, with the aim of demonstrating some application of such categories in an object of reality.

Initially, it is through the category of being that one must interpret the development of the sections at the beginning of *Capital*, then “the contradiction between use value and exchange value can, and should, be read from the dialectic between quality and quantity developed in the *Science of Logic*” (CORRÊA, 2021, p. 229, our translation). This statement, for the author, results from the fact that Marx himself, even without citing Hegel, does not hesitate to highlight the general categories of the being, “every useful thing, such as iron, paper, etc., must be seen from a double point of view, according to quality and quantity.” (MARX, 1988, p. 45, our translation). Which progresses to an analysis between use value and exchange value, Marx (1988, p. 47, our translation) says, “As use values, commodities are, first of all, of different quality, as exchange values they can only be of different quantities, therefore not containing any atom of value.” Similar to logical progression, in which

the imposition of a standard of measurement – historically determined – is foreseen, given the unity of the categories of quality and quantity, Marx (1988, p. 45, our translation) says, “discovering these different aspects and, therefore, the multiple ways of using things is a historic act. As is the discovery of social measures for the quantity of useful things”. Thus, all comparisons between qualitatively different commodities, that is, through the difference in their use values, their quality is determined, as well as their exchange values and the standard of measurement agreed upon in their time. For example, “like all other commodities [gold] also functioned as an equivalent, [...] as soon as it gained the monopoly of this position in the expression of value in the world of commodities, it became a money commodity.” (MARX, 1988, p. 69, our translation). Therefore, it is the money-form.

Next, the use of the essence category begins as soon as the substrate, referring to what is studied, is placed. In the case of *Capital*, “the identification of this substrate requires that the entire series of measurement relations, including the fixed rule (the commodity that takes the form of money), be recognized only as an appearance” (CORRÊA, 2021, p. 232, our translation), from which a substrate is deduced, and as soon as, an essence. This moment occurs in the transition from the sphere of circulation of goods to that of production, as manifested by Marx (1988, p. 140-141, our translation),

[...]Let us then abandon, together with the possessor of money and the possessor of labor power, this noisy sphere [of circulation], existing on the surface and accessible to all eyes, to follow them both to the hidden place of production, on whose threshold one can to read: *No admittance except on business* [...]. [Since] the sphere of circulation or exchange of commodities, within whose limits the purchase and sale of labor power occurs, was in fact a true Eden of the natural rights of man [...]. Because buyer and seller of a commodity, for example labor power, are determined only by their free will [...]. Because they relate to each other only as possessors of commodities and exchange equivalent for equivalent [...]. [However] when leaving this sphere of simple circulation or exchange of commodities [...], the former possessor of money marches forward as a capitalist, the possessor of labor power follows him as his worker; one full of importance, a satisfied smile and eager for business; the other, shy, reluctant, like someone who took his own skin to market and now has nothing left to look forward to except the tannery.

Therefore, in *Capital*, the circulation of commodities, as an appearance, is what is immediately observed. Thus, the researcher, like Marx, who seeks to expose the reality of his object, its dialectics, needs mediations in the studied in order to find in it the essence. From this it should not be concluded that the sphere of circulation of commodities adds nothing to the study and can therefore be bypassed. This is because it is precisely the need for its phenomenon, given to the sphere of production, that will unite both in the objective totality. “Which, basically, is the same as saying that, to understand the origin of capital, it is necessary to overcome the difference between the sphere of circulation and the sphere of production and consider the unity of the two spheres as a totality.” (CORRÊA, 2021, p. 240, our translation).

Therefore, “capital, in *lato sensu*, reveals itself as substance; which means that the relation between the sphere of circulation and the sphere of production must be considered as the relation with itself of the capitalist system.” (CORRÊA, 2021, p. 240, our translation). In resume, the genesis of capital develops this dynamic, “it is therefore,” Marx (1988, p. 134, our translation) says, “impossible for the producer of commodities, outside the sphere of circulation, without coming into contact with other possessors of commodities [as in the sphere of production], to valorize the value, and then transform money or commodities into capital.” Therefore, he concludes that, “capital cannot, thus, originate from circulation, nor can it not originate from circulation. It must, at the same time, originate and not originate from it.”

Finally, in the category of concept, in which the form of the universal, particular and singular is reproduced, Corrêa (2021) calls for attention to changing perspectives that can interpret the form of the concept in different ways. When accompanying the weaver, it has to “his commodities, 20 rods of linen, has a determined price. Its price is 2 pounds sterling. He exchanges it for 2 pounds sterling and [...] exchanges the 2 pounds sterling, in turn, for a Bible” (MARX, 1988, p. 93, our translation). According to Corrêa (2021, p. 245, our translation),

[...] from the weaver's point of view, When we hold ourselves abstractly to it, linen is the universal equivalent, mere exchange value, an abstract object by which the value of others is measured. Money (despite being the universal equivalent for everyone) performs for the weaver the function of a particular mediator, that is, a bridge between the exchange value of his product and the use value of another; the product he will buy with the money obtained from the sale of his linen (a Bible, for example) is the singular term, use value, concrete object for consumption.

A different case occurs from the perspective of the observer external to the process, because, for this, money is the universal equivalent, it is the most abstract commodity, the weaver's linen is something concrete and particular to the weaver, although he considers it only for its exchange value, making the Bible still singular, because, for the weaver, it is considered for its use value. A similar case occurs when observing the producer of Bibles, except that, for him, the Bible is the particular, while the singular would be another commodity of interest in its use value (CORRÊA, 2021). Furthermore, when observing the cycle of the capitalist agent, we see another situation. Corrêa (2021, p. 246, our translation) justifies such an interpretation given that “[...]the middle term is now the synthesis of the process from the capitalist's point of view. [...] the cycle does not occur in the form of C-M-C, but of M-C-M”. In other words, when observing the persona of capital, the initial money is seen as universal, as will occur with the external observer. However, the singular is the concrete universal, made the commodities determined, in turn, the capital obtained at the end of this agent's cycle is nothing more than another particular form of money, the universal. In it, money relates to itself through the commodity, becomes concrete, subject and capital (CORRÊA, 2021).

Through what has been discussed so far, in the next section the concept of number will be glimpsed in the Study Activity, in order to demonstrate the relation with the category of universal, particular and singular and the Davidovian example when exposing his teaching theory.

3 The concept of number in the Study Activity

In the Elkonin-Davídov teaching system, after the exposition of the structure of the Study Activity, Davídov (1988), exemplifies a development of such a teaching model through the concept of number. So, before looking at the Study Activity in its application to this concept, it is worth remembering its structure of six actions: i) transformation of task data in order to manifest the universal relation of the studied object; ii) modeling of the differentiated relation in object, graphic or literal forms; iii) transformation of the relation model to study its properties in ‘pure form’; iv) construction of the system of particular tasks to be solved by a general procedure; v) control over compliance with previous actions; vi) evaluation of the assimilation of the general procedure as a result of solving the given study task (DAVÍDOV, 1988, p. 181, our translation).

With the exposition of the structure of the Study Activity, it is fair to look at the concrete example of an experimental investigation of the concept of number in the first school year. This concept is introduced by determining the following relationships between quantities: “equal”, “more” and “less”⁷. They are what allow the differential comparison of quantities through the object action of students (DAVÍDOV, 1988). In this moment,

even before assimilating the concept of number, he [the student] can fix the results of this comparison with the help of formulas, expressed through letters, such as $a = b$; $a > b$; $a < b$; and accomplish many of its transformations, for example, $a + c > b$; $a = b - c$; $a + c = b + c$ etc., relying on the corresponding properties of the mentioned relations. (DAVÍDOV, 1988, p. 185, our translation).

However, in reality, in some situations it is impossible to accomplish the differential comparison to immediately discover the equality or inequality of certain two quantities. The teacher must lead students to such situations and question them about an appropriate way to solve the task of comparing two quantities. Children must formulate some hypotheses, which, with the help of the teacher, will eventually

⁷ From now on the signs will be used: $=$, $>$ and $<$, respectively, bearing in mind that the relation of more and less should actually be translated as a relation of greater and lesser.

conclude the need to accomplish a new comparison, the mediated differential comparison. Next, the teacher encourages students to ask questions such as: what is mediated differential comparison? With the help of what means is it possible to execute it? How to operate with these means and what results will they lead to? Therefore, the teacher proposes the task that demands the discovery and assimilation of the general mode of mediated differential comparison of quantities. This is based on the comparison of multiple quantities using numbers. Thus, the study actions that lead to the resolution of the task required require students to study the properties of the relation between multiple quantities, the modeling of which develops the concept of number (DAVÍDOV, 1988).

In the first study action of the relation between quantities, according to Davidov (1988, p. 185-186, our translation), “students perform an object transformation of quantities, in which the character of the multiple relation is manifested”. In other words, at this moment, the little ones must find a third quantity by which the relation of the two initial quantities can be measured. The new magnitude provides conditions for mediated differential comparison. For example,

[...]quantities A and B cannot be directly compared (segments cannot be superimposed directly on top of each other). The task data is transformed by the student in such a way that he finds a certain quantity c, the use of which allows him to determine how many times it “fits” into the initial quantities A and B. The search for how many times the quantity c “fits” into the quantities A and B allows the child to determine their multiple relation [of A with c and B with c], which can be recorded with the help of the formula A/c and B/c (the line separating the letters means multiple). (DAVÍDOV, 1988, p. 186, our translation).

In the second study action of the relation between quantities, the multiple relation and its result are modeled in object, graphic or literal forms. For the object model, the multiple relation can be performed with real objects, such as sticks and strings, or drawn segments that “[...] indicate the result of both the separate ‘placement’ of measurements and all similar ‘placements’ (how many times the given measure is contained in the quantity through its multiple relation)” (DAVÍDOV, 1988, p. 186, our translation). In this way, students will be

able to express verbally, through numeral form – once, twice, three times, ... – the result of the multiple relation. This may characterize another model, for example, $A/c = 4$; $B/c = 5$; $4 < 5$; $A < B$, generalizable to $A/c = K$; $B/c = M$; $K < M$; $A < B$. In the end, the literal model of the multiple relation and its result emerges as $A/c = N$. As a result of this literal form, students can perform mediated differential comparison of any particular case (DAVÍDOV, 1988).

In the third study action of the relation between quantities, the model found is transformed in order to provide conditions for studying its generalized properties. For example, based on the model $A/c = K$. If we change the quantity c by a quantity b , with the initial quantity A remaining, we have three situations determined by the relation between the quantities c and b : i) $c = b$, ii) $c > b$, and iii) $c < b$. In the first case, since the quantity c is equal to b , the number of times that b fits in A is the same if the reference is c . Then, the following transformations can be obtained: $A/b = K$ and $A/c = A/b$. In the second case, where c is greater than b , b will fit more times in A than c . Thus, it is possible to generate the following transformations: $A/b = M$, $A/b > A/c$, $A/b > K$ and $M > K$. In the third case, since c is smaller than b , it will fit fewer times in A than c . Therefore, the transformations that can be created are: $A/b = N$, $A/b < A/c$, $A/b < K$ and $N < K$. About these transformations, Davidov (1988, p. 187, our translation) comments,

that children assimilate the content and consequences of this action is of great importance when they become familiar with the world of numbers and constitutes a characteristic feature of the solution of the study task, in which certain general properties of numbers are studied before getting to know the diversity of its particular manifestations.

In the fourth study action of the relation between quantities, the time has come to implement the mediated differential comparison mode, through the multiple relation of quantities in particular tasks, that is, to determine the relation between quantities using numbers. For example, Davidov (1988, p. 187, our translation) says, “[...] find the numerical characteristic of one or another

continuous or discrete quantity in relation to a determined measurement”. The author concludes that, “This action allows children to link the general principle of obtaining numbers with the particular conditions of calculating sets or measuring continuous objects”. In this sense, the test condition for understanding the concept of number by the student is to correlate, through several concrete numbers, the defined measurements of a quantity. That is, defining a numerical characteristic of a quantity, with freedom to choose the unit of measurement. Thus, the study task is solved by developing the general process of obtaining a number, while assimilating its concept (DAVÍDOV, 1988).

The fifth and sixth study actions, in relation to the others, have a certain independence from the content of the study task, therefore, the greatest considerations about them remain in the pure structure of the Study Activity. However, one should not conclude from this a complete divorce from the content of the study task. Especially, in the evaluation action, by indicating, to the student, the course to fulfill the purpose of the study task, that is, its content. Davídov (1988, p. 187-188, our translation) says, in the study task guided to understanding the concept of number, which the control action “[...] allows children, while preserving the general form and meaning of the four previous actions, to modify their operational composition depending on the particular conditions of their application, the concrete peculiarities of the material”. While the evaluation action, “[...] in all stages of solving the study task, guides the other actions towards the final result: obtaining and using the number as a special means of comparing quantities”, which is also the genetic basis of mathematical concepts.

As we have seen, the study task developed the concept of number through a microcycle of ascension from the abstract to the concrete. Therefore, there is the possibility of using the category of dialectical logic, which forms the concrete content of the concept as a paradigm for the content of the Study Activity. In other words, while the category of universal, particular and singular mediates the theoretical concept, to a certain degree, it also mediates the content of the Study Activity. Therefore, in accordance with the example of the concept of circulation of commodities, which are realized in the form of the category of

universal, particular and singular and are determined from abstract universality, through determined universality, to concrete universality, one can make an exposition of the concept of number, presented by Davídov (1988), in order to demonstrate the objectivity of that concept.

That said, it is important to remember that, according to Davídov (1988), the concept of number comes from the multiple relation between quantities. In the same way as any other being, in its first determination, number appears as an appearance and, knowing this, one must unveil the characteristic of appearance in the relation of the process of knowing, the relation as governed by immediacy. In this way, it is possible to return to the classic of the number, which is to appear in anything. Read, regardless of what you are considering, there is a numerical treatment for this. This omnipresence, even useful for different interests, behaves like a numerical layer, of a single level, that covers all reality and, from this, the abstract concept of number immediately develops. This determination of number can be considered only the unmediated moment in the relation of the process of knowing the number, thus, it is the appearance that hides the essence of this being.

When putting the number under analysis, leaving the immediate moment, we find nothing less than the human action that generates the appearance of the number, that is, the act of measuring. The numerical layer that covers all reality does not just contain a single level, it is actually woven by the hands of cognizing subjects, who provide conditions for the numerical treatment of any measurable object, measuring them. In this way, immanent in the act of measuring, there is the essence of number, just note that, in general at work, every worker when measuring something, does so using a unit of measurement – the multiple relation between quantities. In the same way, the human action of measuring is hidden in the abstract concept of number, thus, the essence of the concept, the unit of measurement, is also hidden.

It is important to remember that appearance is always relative to the essence, as the latter is what generates the former, therefore, the appearance is something of the essence and is part of its totality. In this sense, to develop the

concept of number, one must not disregard appearance as just an immediate moment that does not add to knowledge. Instead, one must develop the essence without losing sight of what is apparent, so the number that appears as abstract must be considered together with the unit of measurement, its essence. In this moment, in which the relationship between appearance and essence was established, the concept of number is more determined. For example, in the immediate abstract everything that was permitted to speak of number was nothing more than a tautology – number is number – now, at least, it is authorized to say that number is a product of the human action of measuring. However, the concrete concept has not yet been developed, so far what is known is that its substance is part of reality. As a number to be measured, it behaves like a universal, is independent of any other and can be any number – it can take any form –, for example, A. However, the unit of measurement is more determined. Note that it is extremely important that the unit of measurement is not the same number as the thing to be measured. After all, we seek to establish a unity of opposites, a unity of equals would not present content beyond the formal. A similar case occurs with Marx (1988, p. 60, our translation), when discussing the equivalent form of expression of value

As no commodity can appear as an equivalent to itself, nor can it make its own natural skin an expression of its own value, it must relate itself as an equivalent to another commodity, or make the natural skin of another commodity its own form of value.

Therefore, the unit of measurement is more determined – it can take any form excluding A. Thus, corroborating the search to cover all number determinations, it is essential that the unit of measurement is precisely a $\sim A^8$. In this case, the unit of measurement has a double side. First, it is more determined than the number to be measured, which acts as a universal. Furthermore, even if with another qualitatively different form, its content remains identical to that of the number to be measured – in case of a mistake, one would not measure the

⁸ Not A.

other – therefore, at the same time as it is different, it is placed on the same level. The result of this is that a new category needs to be established, encompassing both: the number to be measured and the unit of measurement. So, it is said that the unit of measurement acts as a particular, through it the universal is particularized while the unit itself is particularized.

This new category formed by the unity between the number that measures and what will be measured is the unity between the being and the essence, it is immediate and mediated at the same time, it is the concrete concept and, therefore, it is called singular. To the observer who interacts with the concept immediately, the concept is nothing more than pure abstraction, that is, it is just the appearance of the being. However, for the attentive observer, who mediates the appearance by the particular essence, the concept is the unity of multiple determinations – it is concrete. In the concept introduced in the Davidovian system, this meaning must be given to the general model of the multiple relation between quantities, between what is measured and the unit of measurement. It is notable that the model $A/c = N$ has the concrete content of number, although, if separated from the literal form, both c and N , that is, both the unit of measurement and the result of measurement, as they share the content of A , will immediately be confused with A itself. However, when mediating A through $\sim A$ – represented by c in the general model of the multiple relation –, it is known that the singular must differ from A by incarnating the multiple determinations between A and $\sim A$, a totality, so that, if it is necessary to give it a form, it is worth using A' . The capital letter translates the return to the beginning (A) while the apostrophe translates the superior quality of abstraction of the being – represented by N in the general model of the multiple relation.

In this way, the concept of number is exposed as the unit between the quantity to be measured, the unit of measurement and the resulting measurement, which conditions the number to the human action of measuring. Furthermore, the category of the universal, particular and singular is manifest in the exposition of the concept of number as the resolution of the contradiction between the measured and the unit of measurement.

4 Final considerations

In possession of the category of universal, particular and singular, we moved on to the exposition of Elkonin-Davídov's Mathematics teaching system, based on the work of Davídov (1988). The relation between dialectical logic and Davidovian teaching is evidenced, specifically, through the structure of the Study Activity. In the case of the category of dialectics under analysis, it serves for an objective exposition of the concept that must be studied, that is, since, in the content of the Study Activity, a concept is sought at a concrete level, this must be exposed through the relation between the universal, particular and singular.

Furthermore, teaching in the Elkonin-Davídov system articulates objective concepts since it is based on a high level of apprehension of reality. Given that the traditional system, in turn, develops subjective concepts, which Davídov understands only as conceptual generalizations, there is a need to overcome such a system through the dissolution of concepts with empirical content by manifesting the dialectical development of concepts and, according to this movement, organizing the teaching. As a result of this, there is the objectivity of the concept of number in the respective system. The relationship between quantities, proposed as the genesis of the content of Mathematics and, therefore, guiding the Study Activity, leads the student to overcome a contradiction, between the quantity to be measured and the quantity it measures, which is fully exposed in the model general number, $A/c = N$, also seen as $A/\sim A = A'$.

Lo universal, lo particular y lo singular en el concepto de número en la Actividad de Estudio

RESUMEN

Este texto es un recorte de la disertación titulada: *Lógicas formal e dialéctica em sistemas de ensino de matemática*. En este sentido, comparte el objetivo de manifestar los elementos de la lógica que median el sistema de enseñanza Elkonin-Davídov, en este artículo en particular, la categoría de la dialéctica dicha universal, particular y singular. Tal objetivo puede traducirse según la siguiente pregunta: ¿cómo se manifiesta la categoría de lo universal, particular y singular en el concepto de número en la Actividad de Estudio? Para desarrollar una respuesta a esta problemática, el texto avanza según las siguientes secciones: 1 Introducción; 2 Lo universal, particular y singular en el concepto de circulación de mercancías; 3 El concepto de número en la Actividad de Estudio; y 4 Observaciones finales. Al final del texto, se muestra un análisis del concepto de número, presentado en el sistema Elkonin-Davídov, basado en la categoría dialéctica denominada universal, particular y singular.

Palabras clave: Lógica dialéctica; Sistema Elkonin-Davídov; Enseñanza del desarrollo.

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