CIÊNCIA e NATURA

UFSM

Ci. e Nat., Santa Maria v.42, e41, p. 1-19, 2020

DOI:10.5902/2179460X44243

ISSN 2179-460X

Biologia-Ecologia Submissão 18/05/20 Aprovação 08/06/20 Publicação 01/07/20

Goethe's morphological method and its contribution in teaching and learning process

O método morfólogico de Goethe e suas contribuições no processo de ensino e aprendizagem

Maíra Kahl Ferraz[I]

ABSTRACT

Goethe's morphological method is still little discussed in the sciences and education, despite its potential to contribute to such disciplines. From the observation of nature, Goethe developed his method based on the interaction between the subject and the object, in which observation and experience played a central role. The Goethian method proposed, then, other possibilities which were being established at the time, challenging a vision of mechanistic and utilitarian nature. These possibilities took effect until contemporary times. The mechanistic view of nature generated problems experienced in the scientific, economic, socio-cultural, environmental, and educational spheres. From this scope, this article aims to explain Goethe's morphological method and point out its possible contributions to education. To this end, a bibliographic survey of the scientific works of Goethe and authors who dedicated themselves to understanding the Goethian method was carried out, in order to establish the guidelines of his method. Since Goethe's method proposes changes in the way of experiencing phenomena and content, it can, in this way, assist in the educational process. Therefore, we understand that Goethe's morphological method contributes to changes in the process of teaching and learning by proposing a participatory role for the subject in this discourse. The sessions in this article sought to develop such an understanding.

Keywords: Goethe's Method; Morphology; Education; Nature; Teaching and Learning

RESUMO

O método morfológico de Goethe ainda é pouco discutido nas ciências e na educação, apesar do seu potencial para contribuir em tais esferas. A partir da observação da natureza, Goethe desenvolveu seu método baseado na interação entre o sujeito e objeto, na qual o olhar e a experiência tinham papel central. O método goethiano propunha, então, outras possibilidades diante de uma visão de natureza mecanicista e utilitarista, que estavam sendo estabelecidas na época e se tornaram vigentes até a contemporaneidade. Essas premissas geraram problemas vivenciados na esfera científica, econômica, sociocultural, ambiental e educacional. Desse escopo, o presente artigo visa expor o método morfológico de Goethe e apontar suas possíveis contribuições para a educação. Para isso, foi realizado um levantamento bibliográfico das obras científicas de Goethe e de autores que se dedicaram a compreender o método goethiano, a fim de estabelecer as diretrizes de seu método. Como o método de Goethe propõe alteração no modo de experenciar os fenômenos e conteúdos, pode por esse caminho auxiliar no processo educacional. Sendo assim, compreendemos que o método morfológico de Goethe contribui para transformações no processo de ensino aprendizagem, ao propor uma maneira participativa do sujeito nesse decurso. As sessões desse artigo buscaram desenvolver tal compreensão.

Palavras-chaves: Método de Goethe; morfológico; educação; natureza; ensino aprendizagem

[I] Instituto Federal São Paulo, SP, Brasil - mairakferraz@gmail.com

1 INTRODUCTION

Countless research on the scope of education is produced in order to contribute to the teaching and learning process. These studies cover various topics such as methodology, didactics,and developmental psychology, as well as history, and the sociology of education. Such approaches, for the most part, are the legacy of a way of doing and thinking about science based on mechanism and Cartesianism.

This scientific legacy not only influences our classroom practices, but also our way of seeing and understanding the world, acting as a scientific frontier that makes us grasp it in a fragmented way, and comprehend nature from a utilitarian perspective. However, this condition can be transcended if we are guided by other scientific paradigms, because, although we inherit modulating traditions for interpreting the world, both in its interior and exterior landscape (ZANONC, 1998), new models of knowledge are always emerging and collaborating for changes in our way of thinking and acting.

In addition, our economic system has numerous flaws that also unfold in school practices. Concerning that matter, many researchers have addressed this issue, such as Paulo Freire, Demerval Saviani, Edgar Morin, to name but a few. Standing out is Paulo Freire upon developing the concept of "banking education". Freire's banking education term is quite complex, but it is not our intention to discuss it here. Rather, we chose to provide the following definition:

> In the banking vision of education, knowledge is a transfer from those who think they are wiser to those who they believe know nothing. A transfer based on one of the instrumental manifestations of the ideology of oppression - the absolutization of ignorance, which constitutes what we call the alienation of ignorance, according to which one is always in the other (FREIRE, p. 83, 2019).

For Freire (2019), in this vision the teacher is one who educates students, being the holder of knowledge. It is the educator who knows what must be transmitted to the student, and does it in an authoritative manner. Thus, the educator ends up reproducing an educational system based on the economic order, as well as, at the same time, a view of the world and of nature that are intrinsic to this logic.

Walter Benjamim (2006, p. 515) said: “That things continue as before is a catastrophe!” Therefore, it would be (and continues being) a catastrophe for us to continue to reproduce this scientific, socioeconomic, and educational system. In this sense, the present discussion seeks to present ideas that supercede an understanding of the world as a totality formed from dividing the junction of the parts. That perspective, upon considering the parts independently in a large system, asserts that they organize themselves. A mistake is made worse, insofar as it strengthens a concept of nature as a resource for human needs, still considering that it can be controlled through technology and science. Such processes, taken together, contribute to the exacerbation of the questions previously raised.

Considering the revealed problem, we understand that this scientific frontier, which inwalls (creates walls) and distances us from nature, can be rethought in the light of Goethe's method. Joahnn Wolfgang von Goethe (1749-1832) is best known for his literary works; however, he contributed a lot to science by creating the morphological method. The main ideas about this method are found in the morphological notebooks (still without translation). According to Goethe himself, his greatest work would be the Doctrine of Colors, a scientific study of colors that contradicted Newton's theory, and was, therefore, little accepted at the time.

In all of his work, be it literary or scientific, Goethe considered the human being as an integral part of nature, being a great indivisible organism, which is to say, that is not understood through its isolated parts. In addition, the Goethian method allows us to reflect on our pedagogical practices, since Goethe, in his works, devised a way of doing science that questioned the Cartesian legacy in vogue at his time. Therefore, this article aims to rescue Goethe's method and point out his contributions to the teaching and learning process, as a possibility of dialogue between different scientific fields and the arts.

2 GOETHE'S MORPHOLOGICAL METHOD

For elaboration of his method, Goethe focused on the observation of nature. He did not intend to establish a philosophical system; in reality, what attracted him was to understand the experience, what it can primarily provide us (TONI; GAJARDO, 2018).

In Goethe's time, sciences valued the role of experience; however, it was linked to the experiments produced, as they were based on the idea of empirical science. However, for Goethe, the idea of experience would be linked to the knowledge process. An understanding of the world in which the experiment, the object, and the subject would be closely connected. Thinking about this issue, in 1879 he wrote: The experiment as intermediary between object and subject (Versuch als Vermittler von Objekt und Subjek), but the article was only published in 1823 with changes.

In this text, Goethe, points out the importance of the experiment, having nature itself as a laboratory. The work does not deny the relevance of the laboratory results, but highlights that the experiments should be done with caution, taking nature as a base and guiding thread. That is, it would first be necessary to look at nature and from that observation create experiments that would be consistent with what was manifested in it. After carrying out the experiments, the attention would return to nature, in order to confirm what was experienced. In this movement, nothing was sought behind the phenomena, because they are the theory itself (GOETHE, 1995). In this way, nature assumes a central role in the Goethian method, being elevated to the condition of a principal laboratory.

In addition to breaking with an empiricist view, dominant in his time, Goethe transgressed another point, by proposing a contemplation free of judgment and pre-established hypotheses. (GOETHE, 2010). For him, prior judgment could lead to misinterpretations, as pointed out: “This completely natural way of considering and judging things seems as easy as it is necessary. But it also makes us susceptible to a thousand errors that can shame us and embitter our lives” (GOETHE, p.19, 2010).

In contemporary times, overcoming the hypothesis as put forth by Goethe, can be considered a barrier, being recurrent and a structuring of doing scientific practice. However, if we set out to look at the phenomena and let them reveal themselves, Goethe's argument becomes appropriate. However, this would only be possible if we refined our gaze. To improve the look in the Goethian view, is to commit to leaving aside what we like or dislike about the phenomenon in question and observing the phenomenon as a whole, showing its relationships.

Logically, we are faced with phenomena that may or may not give us pleasure; however, conducting observations by distancing these judgments is essential for the comprehension of its totality, since we often focus on something (because it has already been pre-established) and we do not see the whole, which impedes the formation of clear concepts, in the words of Goethe:

> As soon as we consider a phenomenon in itself and in relation to others, neither desiring nor disliking it, we will in quiet attentiveness be able to form a clear concept of it, its parts and its relations. The more we expand our considerations and the more we relate phenomena to one another, the more we exercise the gift of observation that lies within us (GOETHE, p. 19, 2010).

Therefore, through the exercise of observation it would be possible to establish the relationships expressed in the phenomenon itself and, from there, with others. Whether our gaze is biased towards our hypothesis or just a way of observing, we end up limiting our understanding. Here is a simple example, imagine that you have never seen a monkey, and can only see it from the back for the first time. You will perceive that the monkey has a neck, tail, and a head covered with hair; your definition of a monkey will be limited to that impression. But if you later observe the monkey from another angle, you will discover that it has a mouth, nose, and eyes. That is why Goethe points out, in his method, the importance of looking, as the phenomenon will reveal itself with greater precision the more refined our view is, the more we dedicate ourselves to such an exercise, understanding the phenomenon in its totality.

Goethe's proposal determines that, in this deepening of the view, the analysis should not be done from the part to the whole, but, on the contrary, from the whole to the parts. "Nature! We are surrounded by it and intertwined with it - we are unable

to step outside it and unable to penetrate it" (TOBLER, 2012, p. 107). Although this maxim was not written by Goethe, it clearly expresses his idea ofnature.

Goethe understands nature from the principle of wholeness, as expressed by Bortofot (1996, p.4): "Goethe´s mode of understanding sees the part in the light of whole, fostering a way to see science which dwells in nature". For Goethe, the infinite, like nature, is not formed by the sum of the parts; in spite of being contained in that totality, they are inseparable. This fact is consistent with the idea developed by him in which each living creature is not a unit - even if the parts appear individually - but a complex, since these organisms are united by their origin. Therefore, he expresses that:

> In each living being there is what we denominate as parts, but so inseparable from the whole that they can only be understood in it, and with it. Nor can the parts be used as a measure of the whole, nor the whole as a measure of the parts; and so, as we said above, a limited living being participates in infinity, or rather, it has something infinite in it - and this we cannot state any better: that we cannot, therefore, fully understand the concept of the existence and perfection of even the most limited living organism in the same way as the immense totality in which all existence is comprehended; it should be explained as being infinite (GOETHE, 2012, p. 44).

Goethe's idea oftotality, in addition to being intrinsically related to his conception of nature, is linked to the way of seeing the phenomenon and seeking its understanding, so there is a close link between the subject and the object. "Everything in the Subject is also in the Object and even more. Everything in the Object is also in the Subject and even more" (GOEHTE, 1987, p. 302). In this way, both the subject and the object contribute to the understanding of the phenomenon, a fact that makes the Goethian method break with the idea of the subject as a mere receiver of information.

Goethe structured his method based on close observation of nature, with plants playing a central role in this process. It was through the investigation of plants that he first perceived the process of form and metamorphosis expressed in nature, leading him to write Metamorphoses of Plants (Die Metamorphose von Pflanzen). Plants, due to their rapid development, have their forms altered in a relatively apprehensive metamorphic process, and when analyzing this dynamic he understood

that there was a primordial plant, Urplanze. Based on this understanding, it clarifies that the plant parts are transformed and assume the shape of the closest part, being the "process by which one and the same organ manifests itself in different ways" (GOETHE, s.d., p. 35). This process can be better understood if we take a plant and remove all parts of it, from the first leaf on the main trunk, passing through the flower, and removing its petals from it until we reach the stigma. By placing all these parts side by side, we will see the transformations of the forms that Goethe refers to, and with that we will understand his statement: "[...] we come to know the laws of metamorphosis, by which it produces one part through the other, and presents the most different parts by modifying a single organ" (GOETHE, 1993, p. 35).

The concept of form for him was not something static, being instead related to principles of structure, form, formation, and transformation of organic phenomena (GOETHE, 2015, p. 57). That is why the term used in German was Bildung (formation) which expresses movement, because it can be used in addition to describing the final product; it is associated with a product in process.

As nature is in constant motion, many of the forms manifested can escape our vision, but with a careful eye they reveal themselves, because according to Goethe, we have the cognitive capacity to develop the "exact sensory imagination" (exakte sinnliche Phantasie). It is described by him as:

> If I look at the created object, inquire into its creation, and follow this process back as far as I can, I will find a series of steps. Since these are not actually seen together before me, I must visualize them in my memory so that they form a certain ideal whole. At first I will tend to think in terms of steps, but nature leaves no gaps, and thus, in the end, I will have to see this progression of uninterrupted activity as a whole. I can do so by dissolving the particular without destroying the impression (GOETHE, 1995, p. 75).

This investigation process based on the interaction between the subject and the object, and also on the observation of the forms expressed both in the phenomenon itself and those visualized in our mind, causes our thinking to be in constant movement, as well as the phenomenon itself; this procedure led Holdrege (2013), to define Goethe's method as "living thinking".

Living thinking illustrates flexible, dynamic thinking, as well as the concept of metamorphosis developed by Goethe. To understand nature from a Goethian view is to consider nature and its phenomena in constant movement, and therefore, in a continuous and infinite transformation; therefore, nature is not understood as a system, but as living. Metamorphosis is, therefore, a key concept in Goethe's morphological method, because: "As we contemplate all forms, especially organic ones, we find, nowhere, anything permanent, anything resting, something completed, but rather [we] note that everything is in constant flux" (OPITZ, 2004, p.7).

By bringing forth the expounded premises, the Goethe method proposes a break with the current science paradigm, which presupposes the separation between subject and object and a static thinking, making possible, therefore, another way to think about our educational practices.

3 RETHINKING EDUCATIONAL PRACTICES BASED ON THE GOETHIAN METHOD

Often as teachers, we question our educational practices and more, their meaning for the teaching and learning process of our students. Currently, much has been discussed about the formation of integral individuals, in order to contribute to the educational process. But how is such a development possible if we still carry a fragmented worldview, in which the human being is compared with a machine and considered to be a superior being, and nature is understood from a utilitarian notion? How many major questions are often left out, such as: What is the role of the individual in the world? What is the sense of the world for us teachers and students?

It is in this sense that the Goethian method presents its seminal contribution. According to Larrosa (2016), there is no one better than Goethe to face the difficult relationship between the sense of the world (here we add nature), and individual construction. In Larrosa's words, the Goethian Bildung regulates these two ideas: "[...] a certain ideal of harmonious and unitary personality and the possibility of a habitable and sensible world" (LARROSA, 2016, p.13).

To try to establish, not ready answers, but points that aim to contribute to the questions raised above, let's go back to Goethe. He believed that the development of the natural sciences was based on the idea that the shape was determined by an intentional primary force and consequently life was created for external purposes. This caused modern human beings to create the habit of valuing nature according to their own purposes, as he emphasized: “Given his need for objects and his use for them, he draws the conclusion that they have been created to serve him” (GOETHE, 1995, p.53). This fact supports the idea that everything that exists in nature is to serve humans, and so it ceases to be plural and becomes disjointed, converted into a group of objects that may be useful now or in the future (GUDYNAS, 2019).

This conception of nature, in addition to commercializing it and thereby generating numerous environmental, scientific, economic and sociocultural problems, promotes the distance between it and we humans. When understood as subordinate to our interests, we lose, besides the responsibility of how we act with it, the connectivity with natural phenomena. To overcome the aforementioned problems, it is necessary to overcome this anthropocentric view of nature and reconnect with it and understand that we are part of a whole, in which all actions are connected. In this way Holdrege (2010) points to the concept of responsibility as being eminently contextual because: “In every action I connect myself with the world. The world then carries my imprint. In this fundamental way I am responsible for everything I do, whether I am aware of it or not” (HOLDREGE, 2010, p.120).

We know that developing such conceptions and going beyond the anthropocentric idea is not an easy path, because as Gudynas (2019) pointed out, our culture starts from science, political debates and development strategies which are guided by this concept. However, if as an educator I am aware of these facts, I can, based on my practices, promote an integrative vision between human beings and nature, and gradually transcend the existing borders between both. For this, an awakening is essential, because “[...] when we are attentive to our experiences, they transform us, they connect us with the phenomenon and thus awaken us, in addition

to the sensations, the awareness of what we are in contact with" (FERRAZ, 2019, p.249).

However, we should emphasize that experience is not information. Information can be acquired without anything touching me or happening; however, the experience is linked to what happening to us (LARROSA, 2002). Therefore, the information is passive and the experience is receptive, being that:

> From the point of view of experience, the important thing is neither the position (our way of positioning), nor the "o-position" (our way of opposing), nor the "imposition" (our way of imposing), nor the "proposition" (our way of proposing), but "exposure", our way of "exhibiting", with all that it has of vulnerability and risk (LAROSSA, 2002, p. 25).

In the above excerpt, Larrosa (2002) draws attention to the fact that, as educators, the important thing is our way of "exhibiting", because his proposal is to think about education from experience/meaning. In this way, experience has been replaced by information, and the concept of learning and knowing is exchanged for information. Consequently, learning starts to be understood as a process of acquiring information, making experience an increasingly rare procedure in our society (LARROSA, 2002). Therefore, what Goethe had indicated as a science error, a priori judgment, becomes a recurring practice in our educational system. This is because we pour an immense load of information on our students without allowing them to experience the phenomena and or content. With this, another problem is generated, because the information is tied to opinion, and thus the modern subject is "[...] someone who has a supposedly personal and supposedly their own, and, sometimes, supposedly critical about everything that passes, over everything that has information" (LARROSA, 2002, p.22).

Constructing their opinions from information and denying experience, the teaching-learning process becomes awkward, for two main reasons: first, knowledge is not produced in a living process with movement and meaning for students, as it is transmitted by holder of knowledge in the form of information; moreover, most of the time, the resources used are expository classes that prioritize only one skill among the various skills that the subjects can develop, logical reasoning.

To exemplify the problems exposed, let us do an exercise to remember both the classes we had and the classes we taught. In my case in all the school environments that I was in, as a student or teacher, with the exception of one or another activity, I can say that, in general, it was certainly my logical reasoning that was the skill prioritized in the teaching and learning process. This emphasizes only one organ, the brain, as if our students had only heads and not a body made up of other organs and members that could develop so many other skills. This idea corresponds to the vision of a human being as a machine, formed by different parts that can be understood or worked individually, or even, it is an understanding that from the union of the parts the whole is formed.

In order to contribute to the understanding of the teaching and learning process, Gadner (1994) in Frames of Mind distinguished seven types of intelligence. With that, he pointed out that people would have different ways of learning depending on the dominant intelligence they have. According to him, the seven types of intelligence are: linguistic intelligence (ability to articulate words in oral or written form), logical-mathematical intelligence (ability to analyze and solve logical and mathematical problems, detect patterns, think logically), musical intelligence (ability playing and composing, recognizing rhythms, notes, tones), spatial or visual intelligence (ability to understand and perceive spatial and visual information and transform it), bodily-kinesthetic intelligence (ability to resolve or express oneself through the body, mental skills (control the movement of the body), interpersonal intelligence (ability to perceive other people's feelings, expressions, mood, and intentions), and intrapersonal intelligence (the person's ability to perceive feelings, emoticons, and sensations). He later added the eighth intelligence, naturalistic intelligence (the ability to recognize the diverse species of nature and to be sensitive to natural phenomena).

Despite the valid contribution of Gadner (1994), the tendency to keep the focus on just one of the parts remains, since many times his theory is used in order to contribute to the development of a dominant intelligence that the person already has; that is, it does not seek to develop the other intelligences the person possesses in a

non-predominant manner. This fact does not, therefore, enable the development of the human being in an integral way. Here we must raise another question: what is the integral development of the human being?

It is not our objective in this article to enter into this important area, which is integral development, but at this point it is relevant for us to reflect, even if briefly, on this topic, putting it in line with Goethe's method. (ANTUNES; PADILHA, 2010, p.24) .

The intention to have an education concerned with the integral formation of the pupils and students already appears in the Law of Basic Guidelines (Lei de Diretrizes de Bases - LDB) (1996), in its article 29, section II, where it is stated that: "Early childhood education, the first stage of basic education, aims at the integral development of the child up to six years of age, in its physical, psychological, intellectual, and social aspects, completing the action of the family and the community" [emphasis added]. And the National Common Curricular Base (Base Nacional Curricular Comum - BNCC) says: "With the Base, we will guarantee the coming together of essential learning components for Brazilian students, their integral development through the ten general competencies for Basic Education [...]" [emphasis added] (2015, p.5).

Although the term integral education appears in official documents, the competencies are not discussed. In the PCN it is only cited in the aforementioned article and in BCNN integral development would be conceived through the development of the general competencies. Therefore, there is no clear guideline for the development of comprehensive education, which in our view could only be achieved by overcoming "banking education", by breaking the boundary between subject and object, and by moving away from the idea of a fragmented and utilitarian nature. And; "This implies taking care of, in the process of human formation, the biological-bodily aspects of sociability, cognition, affection, lovingness, human happiness, ethics, and values" (ANTUNES; PADILHA, 2010, p.24).

Concerning the training of the human being in an integral way, creating the possibility that all students develop the currently called "multiple intelligences," and based on Goethe's scientific method, the Austrian Rudolf Steiner created the Waldorf

Pedagogy at the beginning of the 20th century. Based on the assumption that education is an art, Waldorf pedagogy has as its principle, "[...] it must speak to the child's experience" (BARNES; LYONS, 2003, p.17). That is why his method "[...] comes the encounter; then encounter becomes experience, and out of experience the concept crystallizes" (BARNES; LYONS, 2003, p.17).

In this way, Steiner's pedagogy dialogues with the Goethian method; just as Goethe had pointed out that we should not look at the phenomenon with pre-established hypotheses, Steiner, in his pedagogy, defends the idea of not taking preconceived concepts to the classroom. Instead, we should provide that learners experience the content or phenomenon initially. This is because, for him, when we bring the concept preconceived, we kill the learning; the concept must be something alive, that changes in the course of life: "We must offer the child concepts that in the course of his/her life can be transformed" (STEINER, 2015, p. 63).

The dead concept is understood by Steiner (2015) as that which is presented as a definition, so instead of dedicating ourselves to the definitions of the phenomena, it would be more important to emphasize its characterization, because when we characterize, we open the possibility of placing the phenomenon under different points of view. The characterization is accompanied by the description methodology. Goethe in his morphological method pointed out precisely this methodology, because, when describing the subject, he puts himself in contact with the object, enabling the development of thinking that is alive. Holdrege (2013) points out that description can then become unlimited, because there is always more to smell, touch and see, and he even states that: "It helps us do that we never look at things in a careful and detailed way" (HOLDREGE, 2013, p.46).

For better accuracy of the description procedure, the use of drawing should be a part of the methodology used, as drawing develops another intelligence different from writing, and, in addition, it narrows the relationship between the subject and the phenomenon, making it possible to see things that had not been observed, as he notes: "I have learned that what I have not drawn, I have never really seen" (FRANCK apud LESLIE & ROTH, 2000, p.37).

Drawing is one of the skills that is not encouraged in the school environment. Usually it is worked in with a little more emphasis in elementary school, although, even then it is only bequeathed to the scarce arts classes. Meanwhile, written language is emphasized and charged with diligence. By requiring only written language, we are limiting the development of other skills, as well as the way of interpreting and expressing the world. When we think of drawings, we easily associate them with something beautiful, artistically produced. However, it is not this type of drawing that we refer to here, but rather a "[...] drawing that needs to be discovered in the act of drawing, in flow, without pre-established rules of representation and without the eternal debt to true reproduction" (TRAGANTE, 2019, in press). We already do this with written language, because, although we expect eloquence from the texts of our students, we do not have the desire for them to write like Clarice Lispector or Machado de Assis. Thus, when using drawing as a methodology, we should not expect "Haeckls" or "Monets" but rather allow them, through this language and skill, to experience the phenomenon from another point of view, because from this practice many other forms that were previously unnoticed jump to the eye.

Observing, describing, and drawing are some of the methodologies that Goethe relied on to develop his method, because through these procedures the interaction between the subject and object occurs; the phenomena are experienced, and consequently thinking is set in motion, as both thinking and nature come alive. In this sense Cottrell (1998, p. 259) states that: "As thinking comes alive in nature, and nature comes alive in the activity of thinking, knowledge of the world and knowledge of the self-unite at a higher level where danger of "false contemplativeness" is overcome".

If, when analyzing nature, bringing pre-established concepts and theories, we can fall into 'false contemplation', which is the removal/distancing of the phenomenon, and the construction of a perception based on abstraction and not on the real phenomenon. Therefore, we must be delicate and conscientious in the way we bring forth our concepts, in order to allow the phenomena to reveal themselves (HOLDREGE, 2005). This process Goethe called "delicate empiricism" defined as: "There is a delicate empiricism, which identifies itself with the object in the most

inward way, and thus becomes actual theory" (GOETHE, 1988, p.177). However, this does not mean that the scientifically discussed concepts should be discarded, but if we want to understand them from a Goethian approach, that is, based on the relationship between the subject and the object, the process for achieving knowledge would occur as follows:

> When in the exercise of his powers of observation man undertakes to confront the world of nature, he will at first experience a tremendous compulsion to bring what he finds there under his control. Before long, however, these objects will thrust themselves upon him with such force that he, in turn, must feel the obligation to acknowledge their power and pay homage to their effects. When this mutual interaction becomes evident he will make a discovery which, in a double sense, is limitless; among the objects he will find many different forms of existence and modes of change, a variety of relationships livingly interwoven; in himself, on the other hand, a potential for infinite growth through constant adaptation of his sensibilities and judgment to new ways of acquiring knowledge and responding with action (Goethe, 1995, p. 61).

Goethe's method is consistent with the idea that learning is a process of structuring meanings, only possible from experience; as described, it proposes to experience the phenomenon and bring it to its control, in order to know it in its various manifestations. When this is done, the subject will not only have known the phenomenon, but will also promote an internal change, since by placing himself in relation to his object, his ways of learning have expanded, thus consolidating the teaching-learning process in an active way.

In addition, the Goethian method allows us to get closer to nature and awaken the feeling of admiration. Understanding that nature is a dynamic and unfinished whole, "[...] we should be interested in recapitulating our sense of admiration for the world we live in and trying to forget the concepts and abstractions that we acquired in our formal education, and reflect on what we find directly" (RELPH apud AMORIM FILHO, 1999, p. 73). Our thinking would be a reflection of what happens in nature, therefore, something also alive and dynamic.

Establishing the teaching-learning process in the light of the Goethian method is also, as an educator, to create an internal path of research, proposing to experience it, because just as nature undergoes its metamorphoses, the scientist, who follows the

steps proposed, will be transformed, as Goethe pointed out: "In the sciences, however, a continual circulation takes place - not because the objects themselves change, but because new observations produce a need in each scientist to assert himself, to handle knowledge and the sciences in his own way "(GOETHE, 1988, p. 138).

The beginning of these steps can be taken with that same phenomenon that awoke Goethe for all that reflection - the plants - because: "The plant can teach us to look with the eyes of process into the world" (HOLDREGE, 2013, p. 77). All of this complex method of study and experience can be summarized, but not limited to, by the following steps:

- observing with patience and rigor;
- deepening a sense of wonder to the world;
- using sensual and emotional awareness to experience phenomena as fully as possible;
- attending to connections between phenomena;
- acknowledging and ethical dimension to the practice of science (BROOK, 1998, p. 52).

Therefore, considering the phenomena as living and dynamic organisms, Goethe proposed to us a method of looking at nature, deepening our relations with it, and placing us as an active subject in this whole process. Thus, this method, if applied in educational environments, contributes to an active teaching-learning process, enabling the development of other skills and promoting a vision of nature and human beings as members of the same whole.

4 FINAL CONSIDERATIONS

It is important to remember that the objective of this article is to point out how Goethe's method contributes to the teaching-learning process. That is why we believe it was necessary to first show how socio-cultural, educational, scientific problems, and nature, experienced in our modern society are linked with a way of understanding

nature in a fragmented and utilitarian way, and how this vision consequently extends to education. It was understood that this perspective was inherited from the constitution of a science based predominantly on Cartesianism and mechanism.

Having presented the problems caused by the tendency to do science this way, and to understand nature, we propose that Goethe's morphological method would be one of the possibilities of overcoming this logic of utilitarian and fragmented nature, so that our general objective was to rescue and explain the constitution of that method. The Goethian method reveals a world where nature is taken as a whole; it is considered a living organism, and all the phenomena that are manifested in it are not arranged in a hierarchy, but are, rather, part of a dynamic and interrelated process. To understand these processes and relations from the Goethe method is to place oneself as a participatory subject, it is to consider the connection between object and subject.

The characteristics of the Goethian method contribute to our sense of belonging in the world and responsibility, since “We lose distance and gain a vivid knowledge of the intricate world of which we are a part” (HOLDREGE, 2013, p. 174). In order for this distance to decrease, we must observe the phenomenon, because as we have seen, it is an attentive look, free of judgments, the first step of Goethe's method. Thus, through the look, we concern ourselves with the forms revealed by nature, whether expressed materially or not. In this attitude of admiration for the phenomenon, we propose to contemplate it, describe it, draw it, and characterize it. With that, we put ourselves in relationship with him, actively participate in the knowledge process, and create perspectives of relationships.

These procedures allow the development of experience and perception, essential attributes in the participatory teaching and learning process. In addition to promoting skills that not only logical reasoning, encompassing other dimensions of human formation, because as Freire (2019) reminded us, we educate with the whole body.

REFERENCES

AMORIM FILHO, Oswald Bueno. A evolução do pensamento geográfico e a fenomenologia. *Uberlândia: Revista Sociedade & Natureza*, n°11, vol. 21-22, jan /dez, 1999. p. 67-87

ANTUNES, Ângela; PADILHA, Paulo Roberto. *Educação cidadã e educação integral*: fundamentos e práticas. São Paulo: Editora Paulo Freire, 2010.

BARNES, Henry; LYONS, NICK. Education as an art: The Rudolf Steiner Method. IN: BÄRTGES, Carol Ann; LYONS, Nick. *Education as an art*: essays on Waldorf Education. New York: Steiner Books, 2003.

BENJAMIM, Walter. Teoria do conhecimento, teoria do progresso. In: *Passagens*. Belo Horizonte: Editora UFMG; São Paulo: Imprensa Oficial do Estado de São Paulo, 2006.

BORTOFT, Henri. *The wholeness of nature*. Great Barrington, MA: Lindisfarne Press, 1996.

BRASIL. Lei 9.394, de 20 de dezembro de 1996. *Estabelece as Diretrizes e Bases da Educação Nacional*. Brasília, DF., Diário Oficial da União, 23 dez. 1996.

BRASIL. Ministério da Educação. *Base nacional comum curricular*. Brasília, DF: MEC, 2015. Disponível em: Acesso em: 20 fev. 2020.

BROOK, Isis. Goethean science as way to read landscape. *Landscape Research*, vol. 23, nº 1, 1998.

COTTRELL, Alan P. The resurrection of thinking and the redemption of Faust. Goethe's new scientific attitude. In: SEAMON, D. & ZAJONC, A. *Goethe's way of science*: a phenomenology of nature. New York: State University of New York, 1998.

FERRAZ, Maíra Kahl. *Contribuições do método morfológico e da estética de Johann Wolfgang Goethe para a epistemologia da geografia*. Tese de Doutorado em Geografia -Instituto de Geociências – Universidade Estadual de Campinas, Campinas.

FREIRE, Paulo. *Pedagogia do oprimido*. São Paulo: Ed. Paz e Terra, 2019.

GARDNER, H. *Estruturas da Mente* - A teoria das inteligências múltiplas. 1ª ed., Porto Alegre: Artes Médicas, 1994.

GOETHE, Johann Wolfgang von. *The maxims and reflections*. Translation by Thomas Bailey Saundres. London: Ed. Macmillan and CO, 1908.

GOETHE, Johann Wolfgang von. *Goethe*: Scientific studies (Collected Works Vol. 12 Translation by Douglas Miller. Princeton: Princeton U. Press, 1995.

GOETHE, Johann Wolfgang von. *Teoría de la naturaleza*. 2007. Disponível em: http://www.ataun.net/bibliotecagratuita/Cl%C3%A1sicos%20en%20Espa%C3%B1ol/Goethe/Teor%C3%ADa%20de%20la%20naturaleza.pdf. Acesso em: 21 Jan. 2018.

GOETHE, Johann Wolfgang von. *The experiment as mediator of object and subject*. In Context, New York, p. 19-23, Fall, 2010.

GUDYNAS, Eduardo. *Direitos da natureza*: ética biocêntrica e políticas ambientais. São Paulo: Ed. Elefante, 2019.

HOLDREGE, Craig. *Doing Goethean Science*. In context, 8(1), 27-52, 2005.

HOLDREGE, Craig. *Thinking like a plant*: A living science for life. Great Barrington: Anthroposofic Press, 2013.

LARROSA, Jorge. Notas sobre a experiência e o saber de experiência. Translation by João Wanderley Geraldi. *Revista Brasileira de Educação*, No. 19, p. 20-28. Jan/Fev/Mar/Abr 2002.

LARROSA, Jorge. *Pedagogia profana*: danças, piruetas e mascaradas. Translation by Alfredo Veiga-Neto. Belo Horizonte: Autêntica Editora, 2016.

LESLIE, Clare Walker & ROTH, Charles E. *Keeping a Nature Journal*: discover a whole new way of seeing the world around you. North Adams: Storey Books, 2000.

OPITZ, John M.. Goethe´s bone and the beginning of morphology. *American Journal of Medical Genetics*, 126A, 2004. pp. 1-8. Disponível em: http://onlinelibrary.wiley.com/doi/10.1002/ajmg.a.20619/pdf. Acessado em 27 de novembro de 2017.

STEINER, Rudolf. *Arte e educação I. O estudo geral do homem*: uma base para a pedagogia. Translation by Rudolf Lanz and Jacira Cardoso. São Paulo: Antroposófica, 2015.

TOBLER. In: GOETHE. *Teoría de la naturaleza*. 2007. Disponível em: http://www.ataun.net/bibliotecagratuita/Cl%C3%A1sicos%20en%20Espa%C3%B1ol/Goethe/Teor%C3%ADa%20de%20la%20naturaleza.pdf. Acesso em: 21 Jan. 2018.

TONI, João; GAJARDO, Gabriela. *Morfología y anatomía foral comparada de Loasa placei Lindl. y Loasa triloba Dombey ex Juss.*: un enfoque goetheano de la naturaleza. Santiago: Revista Chagual 16: 35-41, 2018.

TRAGANTE, Christiane. *Para sair como criança*. Texto para qualificação. Rio Claro: 2019. No prelo.

ZAJONC, Arthur. Light and cognition: Goethean studies as science of the future. In: SEAMON, D. & ZAJONC, A. *Goethe's way of science*: a phenomenology of nature. New York: State University of New York, 1998.