Article

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BIOETHICS AND THE TEACHING-LEARNING PROCESS IN CONSTRUCTIVIST PEDAGOGY[1]

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Abstract

This article examines the intersection between ethics, bioethics and constructivist pedagogy in a context of increasing attention to questions of human dignity and integral formation. It highlights the relevance of bioethics in the educational sphere, highlighting how its principles can be applied to promote the ethical and intellectual development of students. Constructivist pedagogy presents itself as an approach that values autonomy, critical thinking and social interaction, aligning itself with the foundations of bioethics. The responsibilities of educators are also analyzed to address ethical challenges, how to balance different values and promote an inclusive environment. Finally, it is proposed to integrate bioethics into teaching to promote more reflective and ethical educational practices, ensuring respect for human dignity and strengthening the moral and intellectual development of students.

Keywords: Constructivism; Ethics and bioethics; Education; Pedagogy.

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A BIOÉTICA E O PROCESSO DE ENSINO-APRENDIZAGEM NA PEDAGOGIA CONSTRUTIVISTA

Resumo: Este artigo examina a interseção entre ética, bioética e pedagogia construtivista em um contexto de crescente atenção às questões de dignidade humana e formação integral. Destaca a relevância da bioética no campo educacional, evidenciando como seus princípios podem ser aplicados para promover o desenvolvimento ético e intelectual dos estudantes. A pedagogia construtivista é apresentada como uma abordagem que valoriza a autonomia, o pensamento crítico e a interação social, alinhando-se aos fundamentos da bioética. Também são discutidas as responsabilidades dos educadores ao lidar com desafios éticos, como equilibrar valores diversos e promover um ambiente inclusivo. Por fim, propõe-se integrar a bioética ao ensino-aprendizagem para fomentar práticas educacionais mais reflexivas e éticas, assegurando o respeito à dignidade humana e fortalecendo o desenvolvimento moral e intelectual dos alunos.

Palavras-chave: Construtivismo; Ética e bioética; Educação; Pedagogia.

LA BIOÉTICA Y EL PROCESO DE ENSEÑANZA-APRENDIZAJE EN LA PEDAGOGÍA CONSTRUCTIVISTA

Resumen: Este artículo examina la intersección entre ética, bioética y pedagogía constructivista en un contexto de creciente atención a cuestiones de dignidad humana y formación integral. Resalta la relevancia de la bioética en el ámbito educativo, destacando cómo sus principios pueden aplicarse para promover el desarrollo ético e intelectual de los estudiantes. La pedagogía constructivista se presenta como un enfoque que valora la autonomía, el pensamiento crítico y la interacción social, alineándose con los fundamentos de la bioética. También se analizan las responsabilidades de los educadores al abordar los desafíos éticos, como equilibrar valores diversos y promover un entorno inclusivo. Finalmente, se propone integrar la bioética en la enseñanza-aprendizaje para fomentar prácticas educativas más reflexivas y éticas, asegurando el respeto a la dignidad humana y fortaleciendo el desarrollo moral e intelectual de los estudiantes.

Palabras clave: Constructivismo; Ética y bioética; Educación; Pedagogía.

Introduction

For a long time, pedagogical practices have been the focus of studies due to their potential to transform traditional teaching approaches.

The constructivist perspective has brought significant changes in ideas, pedagogical practices, and the daily school environment, gradually becoming a central theme in the field of education.

The process of knowledge construction occurs both individually and collectively. In this sense, constructivist thinking aims to make this process as coherent as possible. Therefore, the intersection between Bioethics and Constructivist Pedagogy is relevant, as both are concerned with the integral development of the individual.

They both value autonomy, recognize the plurality of ideas and diversity, encourage critical and reflective thinking, and promote collective well-being. Given this, they share fundamental principles that, together, can foster meaningful learning environments that support intellectual, moral, and ethical development. Thus, how can Bioethics be recognized in the learning process within constructivist pedagogy?

According to Carraro and Andrade (2009), in an article published on the subject, the theoretical constructivist perspective began to be implemented in Brazil in educational proposals, projects, and reforms starting in the 1970s. More recently, the National Curriculum Parameters (Parâmetros Curriculares Nacionais – PCN) have faced numerous criticisms for adopting constructivism as a theoretical reference (ANPEd, 1996; Azanha, 2001; Duarte, 2001; Moreira, 1996).

As a general objective, this research aims to analyze the relationship between Bioethics and Constructivist Pedagogy.

The specific objectives are: To explore the fundamental ethical principles of bioethics. To examine constructivism, its theoretical foundations, and its role in promoting students' ethical development. To investigate emerging ethical issues in constructivist educational practice, such as student autonomy in constructing their own knowledge and the educator's role in providing moral and ethical guidance.

To analyze the ethical challenges faced by constructivist educators in balancing respect for students' diverse values and beliefs while fostering an inclusive and ethical learning environment. To propose ethical strategies and guidelines for constructivist pedagogical practice to ensure respect for students' rights and dignity while promoting an ethical and

collaborative learning environment.To achieve these objectives, we will employ methodological approaches such as a literature review, as this study is qualitative in nature. In line with Gil's considerations (2002, p. 44), bibliographic research is:

> [...] developed based on pre-existing material, consisting mainly of books and scientific articles, and has the main advantage of allowing the researcher to cover a much broader range of phenomena than could be studied directly..

This study adopts a qualitative bibliographic research methodology, engaging in the reading and analysis of texts, articles, and books. To guide this research, we initially conducted a bibliographic survey on topics related to Bioethics, Pedagogy, and Education through the CAPES database (theses and dissertations). In this search, we used the following descriptors: Bioethics, Pedagogy, Education, and Constructivism.

Methodology

In this section, we aim to present the methodology adopted for conducting the research, including the approach, type of research, and procedures used to achieve the proposed objectives. The study will follow a bibliographic approach, involving a systematic literature review to cross-reference information on ethical, bioethical, and constructivist aspects in education. Through a bibliographic research approach, it is possible to conduct a detailed and critical analysis of the existing literature on the proposed topics. This approach is justified by the need to understand the fundamental concepts of ethics, bioethics, and constructivism in education, as well as their interrelations.

The research will employ a literature review methodology, focused on the collection, analysis, and interpretation of previously published materials. This type of research provides a comprehensive and in-depth understanding of the key concepts and theories relevant to the study. The research procedures will involve the following steps: (i) Identification of sources; (ii) Selection of sources; (iii) Analysis and synthesis of data; (iv) Correlation between collected information.

A systematic search will be conducted in academic databases, digital libraries, and scientific journals, using search terms related to ethics, bioethics, and constructivism in education. The selected materials will be evaluated for their relevance and quality, prioritizing works by recognized authors in the field and recent publications. The collected data will

undergo critical analysis, identifying patterns, trends, and gaps in the literature. Syntheses of the obtained information will be developed, integrating related concepts and theories of ethics, bioethics, and constructivism in education. Based on the data analysis, a comparison between the main findings of the literature review will be established, highlighting theoretical and practical contributions to the field of education.

Conceptualization and foundations of bioethics

According to Chauí (2000), ethics can be understood as an exercise in reflecting on morality, based on ideal standards of what may be beneficial for individuals and society. As stated by Conti and Souza (2021, p. 715-718):

> Bioethics emerged in the second half of the 20th century, characterized by factors typical of the period. Initially, it is important to highlight the sociocultural factor. The 1960s, especially in Western countries, were marked by cultural and political movements characterized by critical discourses, which spread throughout the public space. These movements drew attention to issues of justice and equality and the affirmation of individual rights, linked to the exercise of freedom and personal autonomy. Encouraged by this critical awakening, there was also a growing questioning of scientific positivism. In the 1970s, with the popularization of mass communication media, these ideas expanded rapidly, reaching a wide audience. Another factor that contributed to the emergence of bioethics was the enormous scientific and biotechnological development of the period. This scenario, which received various designations ('new biology,' 'biomedical revolution,' 'biological revolution,' 'ecological and medical-sanitary revolution,' 'therapeutic revolution'), was marked by the discovery and refinement of numerous biotechnologies. The first mention of the term 'bioethics' dates back to previous decades—more specifically, to the year 1927—when the word was used by the German theologian Fritz Jahr in an article published in the journal Kosmos. Jahr defined 'bioethics' as an ethical obligation not only toward human beings but toward all living beings.

According to Junqueira (2007, p. 2), "The beginning of bioethics is marked by the publication of two very important works by the American oncologist and professor Van Rensselaer Potter." Van Potter was concerned about the impact that scientific advancements, particularly in biotechnology, were having. Thus, he proposed a new field of knowledge to help people reflect on the possible positive or negative implications of scientific progress for life—both human and, more broadly, all living beings. He suggested establishing a "bridge" between

two cultures: the scientific and the humanistic, guided by the following statement: "Not everything that is scientifically possible is ethically acceptable" (Junqueira, 2007, p. 2).

> Having understood this fundamental principle—respect for human beings—we can use "tools" to facilitate our study and decision-making process on various bioethical issues. These tools are known as principles. The first principle to consider in professional practice is beneficence/non-maleficence (also known as benefit/non-harm). The benefit (and the absence of harm) to the patient and society has always been the primary reason for professions related to physical and psychological health. Beneficence means "doing good", while non-maleficence means "avoiding harm". Thus, whenever a professional proposes treatment to a patient, they must recognize the patient's dignity and consider them holistically. The second principle to be used as a "tool" in addressing ethical issues is the principle of autonomy. According to this principle, individuals have the "freedom of decision" over their own lives. Autonomy is the capacity for self-determination. The third principle to be considered is the principle of justice, which refers to equal treatment and the fair distribution of public resources for health, research, and other areas (Junqueira, 2007, p. 2).

According to Gracia Guillén (1998, p. 100):

> "[...] The four bioethical principles proposed by Beauchamp and Childress must be structured at two different levels, defining the two dimensions of moral life: a public management level, consisting of the principles of non-maleficence and justice, and a private management level, composed of the principles of respect for autonomy and beneficence. The duties of public management (non-maleficence and justice) stem from the fact that life in society requires all individuals to accept certain moral precepts. The duty of justice demands that the state apply these precepts equally to all its members. Therefore, the four core bioethical principles are: Non-maleficence, Justice, Autonomy, Beneficence.

When discussing values, it is important to recognize that they shape our lives, influencing how we were educated and socialized within society. One of the definitions of bioethics ("ethics of life") describes it as a science: "that aims to indicate the limits and purposes of human intervention in life, identify rationally justifiable reference values, and highlight the risks of potential applications" (Leone; Privitera; Cunha, 2001, p. 1162).

Thus, bioethics, as a field of research, must be studied interdisciplinarily, integrating multiple areas of knowledge.

Ethical principles and their application in education

According to Vázquez (1999, p.1), Ethics is the theory or science of the moral behavior of human beings in society. Ethics studies, analyzes, and reflects on human behavior, considering its totality, diversity, and variety. In the conceptions of Santos (2021, p. 1-5):

> "[...] traditionally, there is a tendency to confuse the concepts of ethics and morality. In this period of political tension, for example, the word ethics is in vogue, unlike morality, which is linked to moralism, to that which, in one way or another, has become obsolete, and therefore has a pejorative connotation. However, the fact is that ethics belongs to the realm of thought and reflection, whereas morality pertains to rules, legality, and norms. While the former reflects, the latter describes how to act in the form of rules. [...] Ethics cannot be distant from morality, but they have their specificities. Ethics, since the Greek world, concerns reflection on practical life, that is, on action. Ethical action is the result of a reflected, thought-out, deliberated choice, which presupposes a justification [...] It is directed towards questioning the values that should guide our actions, aiming at the good, which is our ultimate goal."

Just as theoretical moral problems do not identify with practical problems, although they are closely related, neither can ethics and morality be confused. "Ethics does not create morality"; rather, ethics influences all people, regardless of their social origin. Our daily actions often reflect the crisis of ethical values experienced in recent years, which reverberates in all fields, both personal and professional. In education, these conditions are also observed; we have experienced major problems that, from an ethical perspective, are considered as shaping an education deemed egalitarian or as potentially distancing it from this ideal.

The need to problematize issues related to ethics and bioethics in the educational context is becoming increasingly evident. The confrontation of ethical conflicts in the school environment is becoming more noticeable when we experience physical, psychological, and sexual violence, bullying, firearm use, theft, insults, racism, and, not far from this, exclusion based on social class, gender, etc.

Constructivism

Constructivism is a movement that became consolidated at the beginning of the 20th century and has its roots in philosophy, with key figures such as Michel Eyquem de Montaigne

(1533–1592) and Jan Amos Comenius (1592–1670). From there, other names emerged in defense of constructivist thought, among them Jean Piaget, Henri Paul Wallon, and Lev Vygotsky, who advocate that the construction of knowledge occurs through the interaction between the subject, the object, and the environment. Although these scholars present different worldviews and theoretical positions, they all emphasize the importance of social aspects in the process of knowledge construction (Thofehrn & Leopardi, 2006, p. 695).

The constructivist approach should not be understood as a simple theory but rather as an explanatory framework that aims to demonstrate that the teaching-learning process is a social process in which knowledge is the result of the student's personal construction. In the words of Carretero (1997, p. 10), constructivism is the idea that supports the notion that the individual, in cognitive, social, and affective aspects of behavior, is neither merely a product of the environment nor simply a result of their internal dispositions but rather a self-construction that takes place daily as a result of the interaction between these two factors.

Constructivist perspectives of Jean Piaget

The constructivist approach, based on Piaget's theories, posits that the construction of objects and their relationships occurs on multiple levels, with equilibration being the central concept that explains the cognitive abilities of individuals as they interact with people and objects. Carraro (2019, p. 262), citing Macedo (1994), states that although the adaptation of Piaget's ideas for pedagogical practice is inevitable, it is essential to ensure the preservation of the foundations of his theory; otherwise, the pedagogical work would no longer align with the principles of Piagetian constructivism (Carraro, 2019, pp. 261–268).

In this sense, constructivism implemented in schools can only be based on Piaget if the assumptions of his psychological and epistemological theory are adequately considered. "Jean Piaget conducted research through observations, that is, he systematically observed how children construct their knowledge" (Fossile, 2010, p. 106). Alicia Fernández (2001) asserts that every individual has their own learning modality and means of constructing knowledge, which implies a highly personal way of approaching and constructing knowledge. She also emphasizes that for learning to take place, the learner must connect more with the teaching subject than with their learning subject, and the teacher must connect more with their learning

subject than with their teaching subject. “This process begins at birth and is formed into molds or schemas, being a product of our symbolic unconscious” (Serra, 2009, p. 21). According to Fossile (2010, p. 106), Piaget considers four factors essential, and even responsible, for children's cognitive development:

> Biological characteristic, which pertains to an aspect related to organic development and the maturation of the nervous system. Experiences and activities component, which develops when the child acts upon objects. Social interactions aspect, which emerges through the use of language and educational instruction. Stabilization element of actions, linked to the ability to adapt and maintain balance in different contexts and situations (Fossile, 2010, p. 106).

According to Piaget’s studies, children go through developmental stages subdivided into "sub-stages" that must be observed for them to transition from one to another. Jorge Visca considers that in Evolutionary Psychology, we find behaviorist, Piagetian, and psychoanalytic explanations, among others, which do not specifically address learning or its evolutionary process. He adds that the evolutionary learning schema postulates: the existence of four levels of learning—proto-learning, deutero-learning, unsystematic learning, and systematic learning; that learning occurs based on energetic and structural aspects and through the thematization of action schemas; and that the general process and particular learnings respond to structural, constructivist, and interactional principles (Visca, 1987, p. 75).

In one of his works, Piaget defends two theses: the first is that the emergence of intelligence in children occurs “through the functional continuity between the sensorimotor and representational stages, a continuity that guides the formation of successive structures,” and the second thesis is “the interaction of different forms of representation” (Piaget, 1964, pp. 4–5). To explain child development, Piaget proposed that it occurs through imitation, which he describes in three phases: absence of imitation, sporadic imitation, and the beginning of systematic imitation.

> The absence of imitation occurs when no environmental influence triggers imitation. “It happens that, although reflex mechanisms do not directly generate imitation, their functioning involves certain processes that will make imitation possible in subsequent phases. Similarly, if we call imitation the act by which a model is reproduced...” (Piaget, 1964, p. 7). Sporadic imitation is characterized by the fact that reflex schemas begin assimilating certain external elements and expanding through acquired experience in the form of differentiated circular reactions. For example, in the domain of sucking, the reflex schema is enriched with new gestures, such as systematically introducing the thumb into the mouth. Thus, two conditions are necessary for

> imitation to arise: that the schemas be susceptible to differentiation in response to experiential data and that the model be perceived by the child as analogous to results they have already achieved; in other words, that this model is assimilated into an already acquired circular schema (Piaget, 1964, pp. 1–7).

Analyzing systematic imitation:

> "[...] representation begins when there is, simultaneously, differentiation and coordination between 'signifiers' and 'signifieds' or meanings. Now, the first differentiated signifiers are provided by imitation and its derivative, the mental image, which extend accommodation to external objects. Emerging imitation thus manifests itself, in such an example, as a simple extension of accommodation movements, as long as these, of course, are part of an already constituted circular reaction or a global assimilatory activity. Now, regarding the previously examined phonation, the phenomenon is exactly the same, except for the content of the perception to be retained. When the child stops or emits their cooing sounds, they perceive a sound they wish to maintain or repeat; and since this perception is part of a global assimilation schema that is both phonetic and auditory [...]. However, compared to the subsequent phases, the imitation in the third phase, although becoming more systematic, remains limited by the very conditions of the secondary circular reaction. Thus, the imitation typical of the third phase will also be essentially conservative, without attempts at accommodation to new models, as will be observed in the following phases" (Piaget, 1964, pp. 13–18).

Duarte (2001) emphasizes that in recent decades, the dissemination of Jean Piaget's epistemology and genetic psychology as a reference for education has been extensive. This dissemination was carried out through the constructivist movement, which, in Brazil, became a trend from the 1980s onwards, advocating pedagogical principles similar to those of the New School movement. Carraro (2019, p. 262), citing Macedo (1994), states that "the transformation of Piaget's work is inevitable when aiming for pedagogical application; however, it is necessary to ensure that the assumptions of his theory are preserved; otherwise, the pedagogical work will no longer align with Piagetian constructivism." In this sense, constructivism applied in schools can only be based on Piaget if the assumptions of his psychological and epistemological theory are adequately considered (Carraro, 2019, p. 262).

Constructivism according to Lev Vygotsky

Cognitive learning theories aim to understand the dynamics of teaching and learning processes, based on human cognitive evolution, seeking to clarify the relationship between

development and knowledge acquisition. Among these learning theories, Lev Vygotsky's sociocultural theory of human development stands out for its innovative role in describing the acquisition of development and learning processes.

According to Thofehrn and Leopardi (2006, p. 695), Lev Semionovitch Vygotsky, also known as a socio-historical and socio-interactionist constructivist, was a Russian scholar whose academic trajectory was characterized by interdisciplinarity, as he engaged with various fields: arts, literature, linguistics, anthropology, culture, social sciences, psychology, philosophy, and later, medicine. He was born in 1896 and passed away at the age of 37 due to tuberculosis, a disease he lived with for fourteen years. Despite his brief career, his scientific production was intense and significant.

Several theories have sought to understand the complex relationship between development and learning in childhood. Among these approaches, three main theoretical conceptions stand out, each offering a distinct perspective on how these processes interact and influence each other.

For Fichtner (2010, p. 7), development is not a linear process over time but rather a cyclical or rhythmic process. Since different psychic functions such as perception, memory, and imagination develop in different and disproportionate ways, development appears as a restructuring and reorganization of the entire system of these functions. Development always has a systematic character, a process with a future perspective, where the new emerges and grows.

From this perspective, learning is seen as an external process that takes advantage of the progress already achieved in development, without, however, directly influencing or modifying its course. This theoretical discussion, according to Cole and Scribner (1991, p. 9) in The Social Formation of Mind, [...]

> emerged during a period of intense changes in psychology, especially in the early decades of the 20th century. Psychology in Russia and Europe was moving between the antagonisms of different schools, each trying to offer explanations for phenomena. In 1923, at the First Soviet Congress of Neuropsychology, K. N. Kornilov initiated the first major shift in psychology after the revolution. At that time, the Moscow Institute of Psychology was headed by G. I. Chelpanov, a supporter of Wundt's introspective psychology and an opponent of behaviorism. Chelpanov assigned a limited role to Marxism in psychology, accepting that this theory could help explain the social organization of consciousness but not the properties of individual consciousness. Kornilov criticized Chelpanov for the idealistic foundations of his psychological theory and for the limited role he attributed to Marxism in psychology. Kornilov, who called his own approach reactology, sought to

> subject all branches of psychology to a Marxist framework, using behavioral reactions as the basic elements. The greatest reason for the lasting relevance of Vygotsky's work lies in the fact that, in 1924 and the subsequent decade, he devoted himself to constructing a penetrating critique of the notion that understanding higher human psychological functions could be achieved by multiplying and complicating principles derived from animal psychology, particularly those principles that represent a mechanical combination of stimulus-response laws. At the same time, he produced a devastating critique of theories that claim the properties of adult intellectual functions are solely the result of maturation or, in other words, are somehow pre-formed in the child, merely waiting for the opportunity to manifest. Vygotsky was not the only one to use historical and developmental approaches in psychology; P. P. Blonsky had already taken the position that the understanding of complex mental functions requires a developmental perspective. Vygotsky adopted the notion that "behavior can only be understood as the history of behavior" (Cole; Scribner, 1991, p. 9-12).

Contributions of Vygotsky's work and the learning process

Vygotsky presents one of his fundamental theories on how individuals learn, allowing us to understand human development in society. He emphasizes the importance of interactions as a means of acquiring and modifying the external world, establishing a relationship of interdependence. According to Sousa, Oliveira, and Brandão (2019, p. 2):

> Vygotsky presents one of his main theories related to the subject's learning, which allows us to understand human development in society, as the author considers interactions as a means of appropriating and modifying the external world, establishing a relationship of interdependence. For the Belarusian psychologist, children are not born with fully developed human characteristics; rather, these manifest through contact with the environment. Through interactions, knowledge is constructed and shared by the group.
> From this perspective, the teacher must be at the center of mediation, not merely as a transmitter of knowledge but as someone who understands their students, in order to promote actions that intellectually develop thought based on acquired experiences. Thus, Vygotsky critiques traditional education, whose primary goal would be to impart content without the possibility of questioning, in such a way that the presence of strict rules and extreme discipline prevents students from interacting with others, as well as from developing their autonomy.

Contrary to the idea that children are born with innate human characteristics, Vygotsky argues that such characteristics manifest through contact with the environment. He emphasizes that knowledge is constructed and shared by the group through these interactions.

From this perspective, the role of the teacher is crucial—not merely as a transmitter of knowledge but as someone who deeply understands their students, aiming to promote actions that stimulate intellectual development based on acquired experiences. Vygotsky critiques traditional education, which tends to focus on the mere transmission of content without room for questioning. He argues that the imposition of rules and rigid discipline can hinder student interaction and the development of their autonomy.

Vygotsky's work remains relevant and active, with ongoing discussions and revisions of certain concepts that further expand his research, particularly in the educational field, as seen in the works of Freitas (2024), Prestes (2014), and Castro & Teixeira (2023).

Freitas (2024) states that the arrival of the Historical-Cultural Theory in Brazil occurred in the late 1970s, its dissemination began in the 1980s, and efforts to appropriate its concepts started in the 1990s. According to Prestes (2014), Vygotsky's name is well known in Brazil, especially among those dedicated to studies in Pedagogy and Psychology, although his research also underpins work in fields such as Art, Philosophy, and Sociology. The growing number of researchers associated with the Historical-Cultural Theory indicates its expansion, as does the increasing volume of scientific productions based on its principles. However, there is still a need for studies that detail the extent of this expansion.

The importance of Lev Vygotsky's work is undeniable, yet accessing his books in translation in Brazil remains a challenge for those seeking deeper study. As França (2010) points out, Vygotsky's work encourages reflection on the process of becoming and being a teacher—a process mediated by the social group and reinterpreted in a unique way by each individual.

Constructivist Pedagogy, its theoretical foundations, and teaching-learning methods

According to Niskier (1992), education, from childhood to adulthood, has been considered, since Rousseau, a natural process rather than an artificial and repressive one. Natural forces, acting freely, transform the development process into something pleasant,

rational, and harmonious. The educational process has become simple because it is not subject to conventional standards.

> Education was never the same after Rousseau. It was through him that educators such as Pestalozzi, Herbart, and Froebel, among others, emerged, and it was through him that Educational Psychology was founded. As the educational process became natural, it began to rely on natural tendencies for action, emphasizing playful activities. Pestalozzi, a Swiss educator, believed that education was the foundation of social reform. The principle of his work was universal education, and he began his work by comparing the educational practices of the time with the natural development of children. He proposed the "lesson of things" as a pedagogical principle, in addition to direct contact with the child's natural environment. Pestalozzi is at the origin of the modern idea of maturation. For him, forcing a child to conform to a single model was a mistake. He trusted in individual differences. Niskier also mentions Herbart, who developed his theory based on certain philosophers. For Herbart, education is necessary for humans because only through it can they avoid their own destruction. Teaching is the element that shapes character and, supported by Pedagogy, guides the way, establishes levels, and identifies obstacles to achieving proposed goals. Awakening interests means fostering a taste for truth, beauty, and goodness (NISKIER, 1992, p. 93-107).

According to Arias and Yera (1996, p. 11):

> "[...] constructivism did not emerge as a proper pedagogical theory; rather, it is essentially a philosophical-psychological conception regarding the mental development of human beings, particularly children. Within the framework of school education, constructivism views learning as a process of knowledge construction, of its elaboration by the child together with the adult (in this case, the teacher), as a dialogue with the other, but the epicenter of this process is the child itself. Supporting the ideas of Montaigne and Comenius, naturalists who claimed that the foundation of education lies in early childhood and the child's own inclinations, these thinkers laid the groundwork for disciples such as Jean-Jacques Rousseau to advocate for education that respects different needs, as opposed to the traditional education that had been followed for previous generations."

It advocates the idea that people are born only with a set of neurophysiological predispositions for thinking, which need to be developed throughout life. Therefore, mental structures should be conceived as the product of a construction carried out by the child through prolonged stages of individual reflection and interaction with others.

Constructivism—as Sanny S. da Rosa states—is not a method, but it has methodological implications for teaching practice: the importance of the group in correspondence with the social nature of the learning process and personality formation; the role of the learning process and personality formation.

For Arias and Yera, constructivist pedagogy is a democratic proposal. There is, in fact, a certain correlation between the development of intelligence and the organization of individual and social life on democratic and rational foundations (Arias; Yera, 1996, p. 11-13).

Rethinking pedagogy has brought possibilities and challenges that still resonate today. According to Chakur (2006, p. 1-2), "the attempts to introduce Constructivism into Brazilian education are not new. The very National Curriculum Parameters (PCN), implemented from 1997 onwards, are based on Constructivism in its educational version. Law 5692 of 1971 referred to Piaget's stage theory when proposing Activities, Areas of Study, and Disciplines as curricular categories."

> Art. 29. The training of teachers and specialists for primary and secondary education shall be conducted at progressively higher levels, adjusting to the cultural differences of each region of the country, and with guidance that meets the specific objectives of each level, the characteristics of disciplines, areas of study or activities, and the developmental stages of students (Brazil, 1971).

Genetic Epistemology and Constructivism are not a new pedagogical methodology; they may even be "a fundamental contribution to the improvement of pedagogical techniques," according to Franco (1993). However, reducing Constructivism to this single dimension overly impoverishes it, as its horizons and applications are much broader. As Becker (1992, p. 6) aptly defined, "Constructivism, as we understand it, is this way of conceiving knowledge: its genesis and its development."

According to Argento (2008),

> "[...] in the way Piaget theorized, there are some basic assumptions of his theory that must be taken into account if we wish to create a constructivist environment. The first requirement is that the environment allows, and even demands, a significant interaction between the learner and the object of study, integrating the object of study into the learner's reality, within their conditions, in a way that stimulates and challenges them, while at the same time allowing new situations to be adapted to existing cognitive structures, fostering their development. Another fundamental aspect of constructivist theories is the paradigm shift brought by Piaget's concepts—it is the transition from the mere transmission of information to the formation of the student; it is the revolutionary new order that removes power and authority from the teacher, transforming them from an all-powerful holder of knowledge into an educator-learner.".

Professor Heloisa Argento (2008, p. 15) presents a comparison between traditional classrooms and constructivist classrooms. In classrooms considered traditional,"

> [...] the curriculum is presented from parts to the whole, emphasizing basic skills, and following the curriculum must be done rigorously. Students are seen as 'blank slates,' and teachers are generally considered the sole holders of knowledge. The assessment of learning is viewed as separate from teaching and occurs almost entirely through tests. Students complete their work individually. In contrast, classrooms that adopt constructivist thinking design the curriculum in a way that presents the whole before specific knowledge, emphasizing general concepts. Activities are based on sources or references, and there is interaction between students and teachers. Students' thoughts and ideas are considered, aiming to understand their viewpoints for use in subsequent lessons. The evaluation process follows criteria based on the teacher's observation of students' development. Activities are mostly conducted in groups, respecting each individual's time, space, and way of thinking.

A traditional curricular approach, therefore, fragments knowledge into parts. It emphasizes learning basic skills with strict adherence to the established curriculum. Students are considered passive recipients of knowledge, while teachers are seen as the primary holders of expertise. Assessment is treated as a separate entity from teaching, predominantly conducted through tests, and students' work is generally developed individually.

On the other hand, in classrooms that adopt a constructivist approach, the curriculum is designed to present knowledge as a whole, prioritizing general concepts and promoting interaction between students and teachers. Students' thinking is valued, aiming to understand their ideas to guide future lessons. Assessment is conducted through the continuous observation of students' development by the teacher, and activities are often carried out in groups, respecting each individual's time, space, and thought process.

The relationship between traditional and constructivist curricular approaches and bioethics is closely linked to how these approaches shape not only the transmission of knowledge but also how students understand and engage with ethical issues related to biology, medicine, and other life sciences.

Traditional curricular approaches, by emphasizing the fragmented and teacher-centered transmission of knowledge, may not provide students with adequate space for critical reflection on bioethical issues. The focus on standardized tests and assessments can limit students' ability to develop ethical analysis skills and informed decision-making.

On the other hand, constructivist approaches, which promote student-teacher interaction, value students' perspectives, and encourage group discussion and reflection, have the potential to enhance the understanding and application of bioethical principles. By allowing

students to express their views and debate ethical issues in a collaborative environment, these approaches can help develop critical and ethical thinking skills.

Additionally, by prioritizing an understanding of knowledge as a whole and emphasizing the contextualization of general concepts, constructivist approaches can help students better grasp the ethical impact of scientific and technological discoveries in the real world.

Therefore, the choice between traditional and constructivist curricular approaches can have significant implications for students' ethical education concerning bioethics and issues related to the life sciences.

Final considerations

Reiterating the importance of bioethics, it plays a crucial role in our understanding and approach to ethical issues in various fields, including health, science, technology, and, increasingly, education. Our contemporary world is filled with remarkable advancements in all these spheres, each bringing with it intricate ethical challenges that demand a thoughtful and well-founded approach.

Certainly, the relevance of bioethics in all fields of knowledge highlights the importance of incorporating its principles from the earliest stages of knowledge construction. From birth, human beings are immersed in a world of interpersonal relationships and interactions with the environment that shape their perceptions, values, and ethical understandings.

Knowledge construction is not an isolated process but rather an endeavor that is strengthened and stimulated through continuous interactions between the subject and the object of study. These interactions are mediated by interpersonal relationships, which play a fundamental role in the moral and ethical development of the individual.

From the earliest stages of development, children learn about ethics and morality through interactions with caregivers, family members, peers, and other members of the community. This is just as important as the role of the school in shaping this new learner. These interactions provide opportunities for reflection, dialogue, and the internalization of fundamental ethical values, such as respect, empathy, responsibility, and justice.

As children grow and advance in their educational journey, it is essential that they be exposed to relevant ethical issues in various contexts, such as: equity and inclusion, respect for

cultural diversity, ethics in the educator-child relationship, children's safety and well-being, and moral and ethical development from an early age. Encouraging them to reflect on their actions, consider the impact of their choices on others, and cultivate values such as honesty, generosity, and responsibility is crucial. Ethical evaluation and pedagogical intervention should ensure that assessment methods and pedagogical interventions are ethical, fair, and sensitive to the individual needs of children.

Integrating bioethics into the school curriculum can provide a framework for exploring these issues in a reflective and critical manner, empowering students to develop ethical and moral reasoning skills.

Therefore, by recognizing the importance of interpersonal relationships and social mediation in the construction of ethical knowledge, we can create educational environments that promote students' holistic development, preparing them to face the ethical challenges of the contemporary world with responsibility and discernment.

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