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Theory of Objectification: pedagogical possibility for Professional and Technological Education

Teoria da Objetivação: possibilidade pedagógica para a Educação Profissional e Tecnológica

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Abstract

In this paper, we present a proposal for the use of Theory of Objectification (TO) as a pedagogical possibility to be used in Professional and Technological Education (EPT), particularly in Integrated Secondary Education (EMI), offered at Federal Institutes (IFs). Our objective is to analyze the approximation between OT and the theoretical and guiding principles of IFs and the incorporation of TO as a pedagogical possibility in EMI. The research, of a theoretical nature, describes the idea of Integrative Activity (AIn) in the context of EPT, based on the foundations of TO, investigating dialectically through argumentation and questioning of the hypotheses presented regarding the possibility of TO as a pedagogy for EMI. Based on the principles that guide the project of IFs and some basic concepts of TO, we will discuss how TO presents pedagogical viability for EPT. We will present some precepts of training for work, the idea of AIn as a methodological tool applied in EPT and some points of convergence between EPT as an educational modality, TO as pedagogical applicability and AIn as a methodological tool. We consider that with this theoretical discussion we have provided an opportunity for a pedagogy that can meet the specificities of EPT, since TO is especially suitable for this educational modality, is based on the same philosophical principles, with many methodological similarities, and when combined with AIn is based on methodological assumptions that complement each other.

Keywords: Integrated High School; Teaching-learning; Integrative Activity; Joint labour.

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1 INTRODUCTION

The issue addressed in this article prompts important reflection on the challenges faced by education professionals, specifically those working within Professional and Technological Education (EPT) at the Federal Institutes, regarding the need to put into practice the principles established for these institutions. These principles include the inseparability of education, research, and outreach as a founding principle of the pedagogical project, work as an educational principle, and interdisciplinarity as a method.

In the history of the consolidation of the Federal Network and the struggle to establish the rights of the working class—particularly regarding the right to secondary-level and professionalizing education—we observe the transformation of the economic landscape, which forced institutions to "produce a working 'productive citizen', adapted, trained, and educated" (FRIGOTTO, 2012, p. 73), echoing the ideas set forth in Decree 2.208/1997. Therefore, it is essential to clarify the coexistence of tensions between orthodox neoliberalism and the social-economic project, as well as the manner in which education mediated this process. With regard to professional education, this contested project is situated within legislation that affects its functioning and consolidation.

In this context, it is essential to make efforts to consolidate this educational project of the Federal Institutes, so as not to allow a regression to the duality of Brazilian education established in the 1990s, and to ensure the education of workers beyond the instrumental perspective of mere occupational preparation for the job, pursuing instead an omnilateral education. Therefore, this article aims to contribute to this debate by presenting some reflections on the possibilities for advancing this educational project.

On the basis of this proposal, we turn to Theory of Objectification (TO), a theory of teaching and learning, seeking an alignment with the philosophical and theoretical-methodological principles of the Federal Institutes, and we present a proposal for the use of TO as a pedagogical approach in Professional Education, particularly in Integrated High School, offered by the Federal Institutes (IFs). Our objective is to analyze the alignment between TO and the theoretical and guiding principles of the IFs, as well as the incorporation of TO as a pedagogical approach in Integrated High School (EMI).

This theoretical study was conducted at the Federal Institute of Mato Grosso do Sul and explores the concept of Integrative Activity (AIn), describing it as a methodological tool for Integrated High School. It also draws on Theory of Objectification to establish a basis for conjectural dialogues, argumentation, and questioning regarding the possibility of using this theory as a pedagogy for EMI.

We begin by presenting a brief history of the Federal Institutes and the principles that guide these institutions, in order to situate the debate. Next, the basic concepts of TO are presented, including a discussion of incorporating TO as a pedagogically viable approach for EPT. Subsequently, we briefly discuss some principles of vocational education that we consider relevant to professional development, along with their relationship to dialectical historical materialism. Following this, the concept of AIn as a methodological tool applied to EPT is presented, with particular emphasis on EMI courses. We conclude with the presentation of some points of convergence among EPT as an educational modality, TO as an applied pedagogy, and AIn as a methodological tool.

It is important to note that, throughout the article, even before the three research subjects—EPT, TO, and AIn—are formally introduced, the reader is gradually

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acquainted with their concepts in a way that naturally encourages the formation of connections, a point that is best illustrated in the concluding remarks.

2 THE FEDERAL INSTITUTE OF EDUCATION, SCIENCE, AND TECHNOLOGY: HISTORY AND PRINCIPLES

The Federal Institute of Mato Grosso do Sul is part of the Federal Network of Professional, Scientific, and Technological Education, linked to the Ministry of Education, and was created by Law No. 11,891 of December 29, 2008.

The history of the Federal Network began in 1909, when President Nilo Peçanha created nineteen (19) Schools for Apprentices and Craftsmen. Subsequently, these schools became Federal Centers of Professional and Technological Education, known as CEFETs. The initial aim was to provide the "less favored classes" with the opportunity to improve their living conditions, and this policy evolved to the extent that the Federal Network became a robust structure, incorporating the CEFET network, agronomy schools, federal vocational schools, and schools linked to universities, offering higher education, basic education, and professional education.

The Federal Institutes, characterized as pluricurricular and multicampus institutions, offer professional and technological education across different modalities, grounded in the integration of technical and technological knowledge into their pedagogical practices. Through a close articulation among education, research, and outreach, and with administrative, patrimonial, financial, pedagogical-didactic, and disciplinary autonomy, they seek to ensure effective access for all to scientific and technological innovations.

The inseparability of education, research, and outreach constitutes the structural principle of the pedagogical project of the Federal Institutes, since, beyond a formal requirement, it pertains to their conception and identity. Through this epistemological principle, we understand that the process of knowledge production through research can influence the reality of the society in which the institution operates. In this regard, the IFs are guided by fundamental concepts: work as an educational principle, research as a pedagogical principle, and interdisciplinarity as a method.

With the creation of the IFs, there was a significant movement toward the internalization of this project. Through internalization, the IFs seek to address social demands, both local and regional, promoting the improvement of living conditions for the population. This is made possible through the articulation among education, research, and outreach. Grounded in a scientific basis, education enables the development of research and, consequently, produces knowledge that allows for the reinterpretation of existing information as well as the generation of new information. This knowledge is disseminated through outreach programs, promoting the production, development, and dissemination of scientific and technological knowledge while simultaneously providing students with new information through contact with the community, in an inseparable relationship between theory and practice.

It is worth noting that the concept of work within this institutional framework is understood in an ontological sense; that is, as a process involving both humanity and nature, in which humanity, through conscious action, creates and recreates itself and its social relationships. This concept originates from Marx's ideas, which define work as follows:

> Before all, [...] a process in which both man and Nature participate, and in which man of his own accord starts, regulates, and controls the

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> material re-actions between himself and Nature. He opposes himself to Nature as one of her own forces. It sets in motion arms and legs, head and hands, the natural forces of his body, in order to appropriate Nature's productions in a form adapted to his own wants. (Marx, 2010, p.211) - *our translation*.

According to Marx, social existence is not possible without work; that is, work is a foundational category, dialectically essential to the construction of the human being as a social being. It is through work that humans produce the most objective and necessary material conditions for their social existence. In this regard, Lessa (2012, p.220) highlights that "[...] through work we find in nuce all the decisive determinations of the human world." Therefore, the essential function of work is to satisfy individual and collective needs, serving as the starting point for the production of knowledge and culture within social groups.

The concept of work as an educational principle aligns with a particular vision of the human being, society, and education. For Ramos (2005, p. 119), "Viewing work as an educational principle implies referring to an education grounded in the historical and ontological process of the production of human existence, of which the production of scientific knowledge is one dimension." In this regard, work constitutes part of the mediation between humans and the object under investigation. Moreover, through the notion of social appropriation of the knowledge produced, it becomes possible to attribute new meaning to society.

According to Ciavatta (2005), work, when adopted as an educational principle, is grounded in the integration of science, technology, and culture as the foundation for the development of pedagogical policy and curriculum design at all levels and in all types of education. For its part, the Ministry of Education emphasizes in the Framework Document for Secondary-Level Technical and Professional Education Integrated with High School (BRASIL, 2007) the true meaning of integration, understood as a concept of holistic human development:

> These dimensions are work, science, and culture. Work understood as a human achievement inherent to being (ontological sense) and as an economic practice (sense associated with the mode of production); science understood as the knowledge produced by humanity that enables the contradictory advancement of the productive forces; and culture, which corresponds to the ethical and aesthetic values that guide a society's norms of conduct (BRASIL, 2007, pp. 40–41). - *our translation*.

Omnilateral education refers to the development of all dimensions of life across all educational processes, encompassing both basic and higher education, and seeks to break with the logic of capitalist society. Integration, in this philosophical sense, enables omnilateral education because it encompasses the fundamental dimensions of life that sustain social practice: work, science, and culture (RAMOS, 2008). Therefore, omnilateral education is articulated with work and human development as a process of striving to overcome class divisions, thereby affirming the educational principle of work. In contrast to omnilaterality, unilateral education results from the division between work and alienated labor.

By adopting as a principle the inseparability of education, research, and outreach, it becomes clear that the "class" cannot be conceived in a narrow sense but

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only in a broader one. Thus, a "class" is not considered merely as the formal space within the classroom or laboratory—that is, restricted to campus locations—but rather, in a broader sense, the class occurs in all spaces, both inside and outside the institution, where knowledge is constructed and the individual and the community in which they are embedded are transformed. In this regard, this transformation occurs through education, using science, in service of society. Therefore, the knowledge produced by humanity, mediated by work and the actions taken by the subject, is socially legitimized, explaining and enabling the modification of reality.

Ramos (2008) highlights that the other dimension of life that needs to be integrated into educational processes is culture. According to the author, culture is formed by "[...] values and rules that guide and shape us as a social group. Social groups share ethical, moral, symbolic values that organize their actions and aesthetic and artistic productions, etc." In this regard, the transformation of the subject mentioned here also takes place within culture, as reflected in aesthetic changes in society.

Research and outreach, across courses at all levels and modalities, constitute specific and systematic work, articulated with the curriculum and society's aspirations. Thus, research as a pedagogical principle is closely connected to work as an educational principle. Through research, students, whether individually or in groups, are encouraged to formulate research questions and seek answers to academic problems or work-related issues, conducting academic or applied research as part of an autonomous process of constructing and/or reconstructing knowledge, while developing awareness and autonomy in their engagement with social practice. At the same time, research must be committed to generating knowledge and insights aimed at improving collective living conditions, prioritizing the use value of the goods produced and the autonomy of individuals in the workplace. This process of raising awareness and fostering autonomy leads individuals to develop critical thinking and ethical conduct when proposing solutions in educational and professional practice, as well as in political, cultural, economic, and social matters.

It is through interdisciplinarity, acting as an integrating axis, that connections among the content of various disciplines are established as part of a broader process of knowledge construction; that is, as a system of relationships within a holistic framework for the production and socialization of knowledge, whose goal is to explain, understand, and establish connections between general and specific knowledge, within an inseparable unity of theory and practice in the teaching and learning process.

It is only by recognizing the inseparable nature of teaching, research, and outreach, and by acknowledging that individuals can choose their own educational and career paths based on the autonomy granted to them through an understanding of the environmental, economic, political, social, historical, and cultural aspects of the sciences, technologies, and arts present in the curriculum, that it becomes possible to achieve the full development of the human individual, as noted by Saviani (2013).

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3 MAIN CONCEPTS OF THE THEORY OF OBJECTIFICATION (TO)

TO, as a theoretical and methodological framework, is a general theory of education and learning within the field of contemporary sociocultural theories. This theory, developed by Luis Radford, questions the assumption that knowledge and learning must necessarily emanate from the student for learning to occur. Radford criticizes the absolutist perspective that reduces the relationship between teacher and student to two possibilities: either students receive knowledge from the teacher (transmissive model), or learning emerges from the student (constructivist model). Radford (2021) proposes an innovative approach, suggesting that both the teacher's and the student's roles must be reconceived, along with the concepts of knowledge, understanding, and learning. He conceives of education and learning as processes that involve both understanding and personal growth.

3.1 KNOWLEDGE, KNOWING, AND LEARNING

In many learning theories, it is common to conceptualize knowledge and knowing without distinction, as well as to relate knowledge to the idea of constructing something, in accordance with sociocultural and constructivist approaches. In transmissionist and behaviorist approaches, learning is understood as the transmission and reception of knowledge (Radford, 2021).

In TO, knowledge is a historical and cultural entity, understood as the capacity to generate actions and thoughts that are always in motion. Radford, in an interview with Moretti (2018), states that:

> [...] the knowledge is conceived as a general entity that, ontologically, is already inserted in culture when we are born. Knowledge is composed of the historical archetype and culturally constituted of thoughts, reflection, and actions.[...]. Such knowledge is always changing. It pertains to, after all, a dynamic ontological entity (MORETTI, 2018, p.254). - *our translation*.

Knowing is also a historical and cultural entity, but it is a concrete, materialized form of learning, something we can perceive and experience. For example, chemical knowledge is the theoretical content that an individual has internalized from the field of chemistry. Knowing is, therefore, the embodiment of knowledge when it (knowledge) becomes something that can be perceived or sensed. Radford (2021, p.89) states that “knowing is an excess in relation to knowledge”, yet it is not determined by knowledge; rather, it is overdetermined by knowledge. “Without this overdetermination, we would be repeating things like puppets.” Radford defines knowing as:

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> The concrete conceptual content through which knowledge is embodied and materialized or actualized. [...] knowledge and knowing are related through activity [...] all knowing is mediated by an activity (RADFORD, 2021, p.78). - *our translation*.

Learning in TO involves the active and creative engagement with historical and cultural systems of thought and action, which requires individuals to invest effort and energy in developing a critical and ethical stance toward cultural knowledge (RADFORD, 2021). In TO, learning is understood as a communal and collective process of developing a way of reflecting on the world, guided by historically constituted epistemic-cultural practices (RADFORD, 2021). In the learning process, knowledge is mobilized through a historical-cultural activity—a practical and collective activity that sets in motion a process enabling students to encounter forms of knowledge that are transformed into understanding, progressively revealed to their consciousness. This process is related to teaching and learning, which we discuss in the next section. In short, Gobara confirms that:

> Knowledge is the potential to understand something; knowing is the actualization [materialization] of knowledge; and learning (objectification) is the awareness of the ways in which the process of actualizing knowledge and the subject, who is, by nature, human, takes place (GOBARA, SILVA, PLAÇA, 2019, p.48–49). - *our translation*.

3.2 OBJECTIFICATION AND SUBJECTIFICATION PROCESSES

Our encounter with culturally and historically constituted systems of thought, including mathematical and scientific ones, is what TO refers to as objectification.

Radford (2019) explains that from this concrete encounter with knowledge, there is always a residue, an excess that remains beyond our encounter with knowledge; objectification is always partial, an attempt to engage with knowledge, to become aware of it or conscious of it. The processes of objectification are those social and collective processes through which individuals become progressively aware of a culturally and historically constituted system of thought and action—a system of which we gradually and partially become aware as we attribute meaning. Therefore, the objectification processes are:

> Processes of objectification are those processes of attempting to notice something culturally significant, something that is revealed to the consciousness not passively but by means of the corporeal, sensible, affective, emotional, artefactual, semiotic, and creative activity of the individuals (RADFORD, 2019, p.3065).

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In this context, learning is defined as the result of objectification processes. Given that systems of thought are always only partially revealed, these processes are therefore infinite.

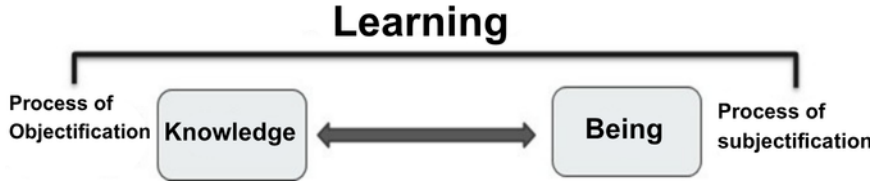
With regard to processes of subjectification, classrooms produce not only knowledge but also subjectivities, activity—a that is, unique human beings. Learning, therefore, involves emotions and affect, not merely as concomitant phenomena of learning, but as constitutive parts of it, which ultimately shape us. Radford characterizes this as follows:

> The process ses where, co-producing themselves against the backdrop of culture and history, teachers and students come into presence. To come into presence refers to the idea of the student as someone who, through classroom activity, comes to occupy a space in the social world and to be a perspective in it. (RADFORD, 2019, p.3065/3066).

He refers to the fact that this presence is rooted in the idea of the student as someone who, through classroom activities, comes to occupy a place in the social world and participate in it, representing a dialectical relationship between culture and the individual. In this dialectical movement, both students and teachers are considered subjects in construction, open to the world. In the words of Radford, "Teachers and students are conceptualized as unfinished and continuously evolving projects of life, in search of themselves, engaged together in the same endeavor where they suffer, struggle, and find enjoyment and fulfillment together" (RADFORD, 2019, p.3066).

For each process of objectification, a subjectification process occurs simultaneously, as classrooms produce not only knowledge but also subjectivity. The individual is in a state of constant change and, through interaction with the world, is shaped and transformed by the surrounding cultural ways of life. According to Gobara et al. (2019, p. 52), "The processes of objectification and subjectification are respectively the actualization of knowledge and being through an activity." Therefore, learning in TO is defined by the simultaneous processes of objectification and subjectification—that is, the encounter with knowledge and the transformation of the self, as represented in Figure 1.

Figure 1: Learning according to TO



Source: adapted from Gobara *et al* (2019).

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3.3 JOINT LABOUR

When we are in the classroom, an activity—referred to in TO as "joint labour"—is termed as such to avoid confusion with other meanings of the word "activity" and also to emphasize the idea of activity as a historically produced form of aesthetic life. Radford (2018) proposes joint labour as a way for students and teachers to interact collectively to achieve their goals, thereby fostering human cooperation.

Regarding teachers, they participate in joint labour, albeit with different roles: "they are also in formation, working shoulder to shoulder" (RADFORD, 2017, p.138) with the students, who begin to engage with and discover knowledge (materializing and transforming it into understanding). Therefore, teachers are also part of this movement, learning alongside students, and, in this sense, they are not mediators, as other theories consider them to be.

Joint labour is considered the main category of TO and its unit of analysis. It is a means of enabling the processes of objectification and subjectification, carried out with the aim of fostering human cooperation. The participants in the activity engage in collective actions that enable the actualization of knowledge and the transformation of the self. In this perspective, both teachers and students are seen as active agents who engage in productive activities to satisfy their needs and contribute to society. In the following section, we define Teaching and Learning Activities.

3.4 TEACHING ACTIVITIES AND LEARNING (AEA)

In TO, the collective work of students and teachers in pursuit of a common goal is established through a Teaching and Learning Activity (AEA). There are two phases of AEA: first, it must be planned by the teacher, based on the didactic project, starting from a structure identified by the subject-objective-task triad (RADFORD, 2015). The second phase is the classroom implementation, as joint labour, as discussed in the previous section.

In the AEA structure (Figure 2), the object is the knowledge to be materialized through a process that begins with the establishment of the objective(s) to be achieved for the completion of the assigned task. This task is composed of problems, questions, and actions. It is through joint labour, by solving the task, that knowledge, which is potentially embedded in culture, is mobilized and materialized as knowing, becoming part of the consciousness of students.

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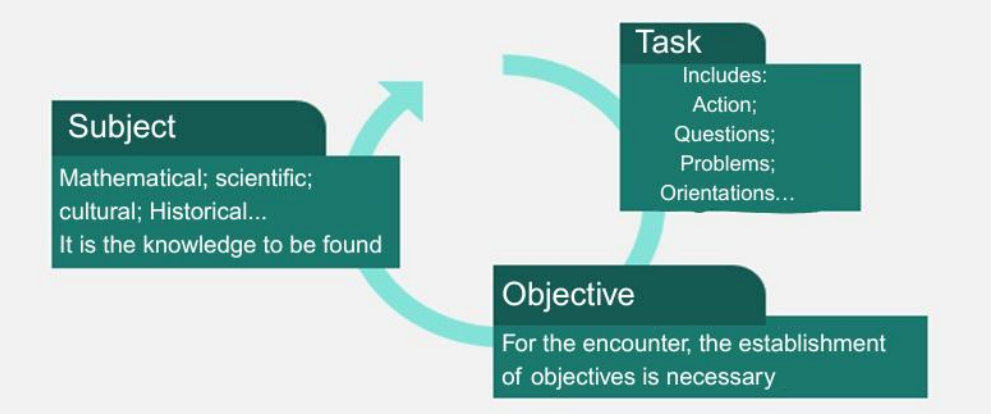
Figure 2: Basic structure of AEA



Source: adapted from Radford (2015, 2021).

Learning takes place through these collective forms of knowledge production and mobilization, and through human collaboration, mediated by joint activity or labor and guided by a community-based ethic rooted in modes of collaboration and human interaction, governed by the principles of solidarity, commitment, responsibility, and care for others, thereby fostering a critical mindset (RADFORD, 2021). According to Radford (2021), communitarian ethics plays a fundamental role in the central concept of TO—namely, collaborative work—regarding which he states that "if communitarian ethics is not taken into account, collaborative work makes no sense" (RADFORD, 2021, p. 289).

4 DIALECTICAL HISTORICAL MATERIALISM AND VOCATIONAL TRAINING

Dialectical-historical materialism considers work as a process of human action upon nature, and it is precisely this action that differentiates us from animals—that is, what makes us human beings. The process between humans and nature seeks to guarantee the material conditions for subsistence, which Saviani (2013) termed material work. Conversely, intellectual work does not produce material goods; this is what the author termed non-material work, and it is precisely within this type of work that teaching is situated, as in the case of vocational training. To understand the different levels of preparation that workers need to perform their work, Faria (2021) proposes five types of workers based on their mastery of work. Building on the foundations laid by this author, we now describe each of these five types in detail, as they are used to implement an Integrative Activity.

A worker in the apodictic domain is completely uninformed about their job, someone who is entirely unaware of the specifics of what they do. Such a worker would be nothing more than a mere task-performer, carrying out work based solely on opinion, without concern for error, bound by common sense, lacking proper training, and completely devoid of knowledge, without regard for coherence or meaning. A worker in the apodictic domain is prone to mistakes.

With basic knowledge and having begun their preparation for work, we have a worker at the propaedeutic level, the second stage in their training for work. This type of worker already possesses the necessary foundation for the proper execution of their work. This worker is better prepared to carry out the tasks assigned to them, although still exposed to the possibility of mistakes, since they do not yet have complete knowledge of all the actions involved in their work; however, they are better prepared than those who are completely uninformed.

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When workers are able to execute the actions of their work—that is, when they begin to put into practice what they have learned during preparation—we have a worker with a praxissistic domain. This worker would be assisted by another with higher qualifications who would guide them in the execution of their actions. Workers in the praxissistic domain are not immune to error either; however, because they have already put their knowledge to the test in practice, they are better positioned in the workforce.

Through the deepening of knowledge via the work they perform, workers move toward the epistemic domain—those who seek greater efficiency in the performance of their work. This would be a worker capable of surpassing their mentor in the praxissistic domain. Such a worker possesses the most up-to-date knowledge relevant to their work and is able to perform tasks more quickly and cost-effectively in terms of both time and resources. This is the worker who develops expertise and cultural knowledge related to their work.

The worker we should ultimately strive to develop, according to Faria (2021), would be one of the maieutic domain, the final level of development. Workers of the maieutic domain would be innovators, talented in transforming the execution of their tasks, ingenious in the development of new and efficient processes, agile in the construction of their own knowledge, and adept at responding to questions that have not yet been posed.

In general, it can be said that vocational training initially produces a worker in the apodictic domain; over time, this worker receives propaedeutic training and then, through assisted application, is directed toward the praxissistic domain. It is at this point that vocational training currently ends. It is necessary to go further; there is a need to advance, at the very least, toward training workers with an epistemic domain, so that we may aspire to produce workers with a maieutic domain. Table 1 provides a detailed description of the five domains of workers, focusing on their characteristics and ability to perform their duties.

Table 1: The areas in which the employee excel are based on their characteristics and ability to perform their work duties.

Domains	Characteristics	Capability of execution
Apodetic	Spontaneous	- Uses common perceptions in the execution of tasks; Usually instinctive in their actions; A person of naive action;
Propaedeutic	Trained	Able to automate actions; Possesses basic information;
Praxisistic	Experienced	- Acquires knowledge during execution; - Possesses practical work experience;
Epistemic	Knowledgeable	- Specialized in the execution of work; - Possesses control over their own tools of work;
Maieutic	Inventive	High level of creativity at work; - Big capacity for innovation at work;

Source: Adapted from Faria (2021).

Understanding that it was work that shaped the human being, the greater the

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mastery over work, the more humanized it becomes; accordingly, it is important that workers are capable of understanding the different aspects of their work. For vocational training to be complete, it is necessary to address all the basic requirements of work. In the initial proposal of Historical-Critical Pedagogy (PHC), systematized by Saviani (2013), there were three such requirements—science, ethics, and the art of labor—which the author termed the representations of labor. Faria (2021), in discussing the dimensions of vocational training, adds two more—innovation and work management—bringing the total to five, which are presented below.

In vocational training, it is important for workers to have a comprehensive view of the different aspects of their work; it is precisely through the scientific representation of work that the perception of action is broadened. The science of work is grounded in natural laws, and understanding these laws helps us better comprehend the work we do. To ensure a thorough understanding of how these laws are applied, workers must be educated from a variety of scientific perspectives.

> The science of work is grounded in natural laws; it is both broad and specific, encompasses its historical development, employs cumulative procedures, regards errors as an important part of the process, and enables the anticipation of situations (Faria, 2021, p.260). - *our translation*.

A worker who is fully trained in their job needs to understand how that job is typically described, and to better describe the job, they need to understand the nature of the art of work. This representation includes the language of work that is desired to be produced. It is the representation that deals with the symbols, the different signs, the semiotics involved, the graphic, sound and phonological expressions, specific to the work. Being trained by understanding the art of work makes it possible for the worker to communicate efficiently and comprehensibly.

> The culture surrounding a particular type of work is historically shaped by those who create it through written records and traditions. A comprehensive understanding of the cultural phenomena surrounding work cannot be achieved through in-depth study alone, as this approach might overlook customs, accents, facial expressions, habits, and other aspects that written records would fail to capture (Faria, 2021, p.263). - *our translation*.

Over time, work requires improvements in its processes, efficiency, productive capacity, ergonomics, and costs. The representation that fulfills this requirement is work innovation. Training workers to evaluate productive processes, to improve the actions involved in their work with full inventive capacity, and, taken together, to create new products is what characterizes innovation.

> A worker educated with this concern in mind could make a significant contribution to their professional field, leading to personal and collective gains that could result in social improvements. Such workers should be educated with a view toward the constant innovation of their field. A worker with a critical and innovative perspective is closer to a maieutic worker, which is ultimately the type of worker we aim to develop (Faria, 2021, p.265). - *our translation*.

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Work management focuses on preparing workers to manage their professional tasks. With full command over the management of their work, workers have control over the technical possibilities involved in its execution, manage the logistics of each step, and handle the other administrative aspects of the work performed.

> It is in work management that workers should be provided with the necessary knowledge of their organizational possibilities as a class, as well as the importance of this organization for the maintenance and expansion of their achievements. This is the representation that considers questioning the hierarchical structure of work, both in terms of expanding it and in terms of the need to bridge the gap between management and production (Faria, 2021, p.266). - *our translation*.

Table 2 presents the implications of the representations of work and the characteristics of each representation.

In general, it can be said that vocational training initially produces a worker in the apodictic domain; over time, this worker receives propaedeutic training and then, through assisted application, is directed toward the praxissistic domain. It is at this point that vocational training currently ends. It is necessary to go further; there is a need to advance, at the very least, toward training workers with an epistemic domain, so that we may aspire to produce workers with a maieutic domain. Table 2 provides the representations of work, their characteristics, and possible implications.

Table 2: Representations of work, their characteristics, and possible implications.

Representation	Characteristics	Implications
Science	Natural laws; Historicity; Mathematics; Geopolitics and society.	Enables predictions; Analysis and investigation; Verification and recognition; Knowledge.
Art	Command; Representation; Control Heritage	Capability of reproduction; Metaphors; Signs; Semiotics.
Ethics	Regulations; Moral principles; Rules; Laws; Customs	Workplace morality; Honesty; Administrative integrity; Respect for diversity; Environmental principles;
Innovation	Modernity; Improvement; Restructuring; Contemporaneity; Criticality	Technological update; Energetic efficiency; Costs control; Environmental preservation; Sustainable progress;
Management	Authority; Administration; Entrepreneurship; Coordination; Negotiation;	Business leadership; Public asset management; Control of private assets; Exercise of responsibility; Administrative engineering;

Source: Adapted from Faria (2021).

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The science of work, the art of work, the ethics of work, the innovation of work, and the management of work are the different representations proposed by Saviani (2013) and Faria (2021). In order to develop workers who have full mastery of their work—that is, workers with maieutic mastery—all aspects of work must be considered, and a methodology that addresses these issues is necessary.

5 INTEGRATIVE ACTIVITIES AS A TOOL FOR EPT

The Professional and Technological Education currently offered at Federal Institutes in Brazil possesses unique characteristics that have long demanded a pedagogy capable of addressing its specificities, particularly regarding Integrated High School. In this educational model, there is a need for omnilateral preparation for work, which also demands a methodology specifically centered on this issue. Teachers and researchers in EPT have been addressing this issue for some time, recognizing that one of the most investigated factors is the need for curricular integration, a critical consideration for the genuine completion of vocational training.

In his 1971 doctoral dissertation, Professor Dermeval Saviani had already identified some key steps needed to overcome educational segregation, which at the time was enforced through the technical education system imposed on Brazil by the military regime (MARSIGLIA; CURY, 2017). His contributions, developed over time, began to take shape as what would later be called Historical-Critical Pedagogy (PHC). This theoretical foundation was used, at various times, as a basis for the construction of what we now call EPT, primarily because it pertains to a pedagogy in which work is central.

Historical-Critical Pedagogy, systematized by Dermeval Saviani, presents a series of theoretical-methodological advances that reinforce its relevance in the contemporary educational context. Grounded in the dialectical conception of history, this pedagogical approach seeks to link education with historical and social processes, promoting a transformative praxis, which is fully consistent with the aims of EPT.

Among the main advances presented in the work Historical-Critical Pedagogy: First Approaches (Saviani, 2013), one can highlight the interplay between history and philosophy, which guides pedagogical practice from a critical and contextualized perspective. Saviani emphasizes the centrality of scientific knowledge in the educational process, arguing that the school must function as a space for the socialization of the knowledge accumulated by society, overcoming common sense.

Furthermore, Saviani explores the integration of Historical-Critical Pedagogy with historical-cultural psychology, particularly the contributions of Vygotsky, which enrich pedagogical practices by considering the development of higher psychological functions and pedagogical mediation. Another relevant aspect is the emphasis on critical teacher education, which connects theory and practice, preparing teachers to face the challenges of transformative education.

These methodological advances reflect the commitment of Historical-Critical Pedagogy to the development of an emancipatory education and the creation of an educational praxis that not only reproduces knowledge but also contributes to social transformation.

Therefore, it is evident that over the decades, PHC has advanced significantly in methodological terms, especially by integrating theoretical foundations with

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transformative pedagogical practices. An example of this methodological advancement is the adoption of the Problematizing Methodology, which seeks to connect education to the social reality of students and has been applied in teacher education programs, such as at the University of Brasília, promoting an innovative and critical approach to learning (Gontijo, 2024). Another example is the use of PHC as a methodological approach in specific disciplines, such as Philosophy (Nascimento, 2021), which demonstrates its flexibility and capacity for adaptation across different educational contexts.

In the case of EPT, whose core concerns are the transformation of praxis and social change, and whose foundation is PHC, further efforts are still needed for its complete implementation across the multiple courses offered to the community, especially in EMI.

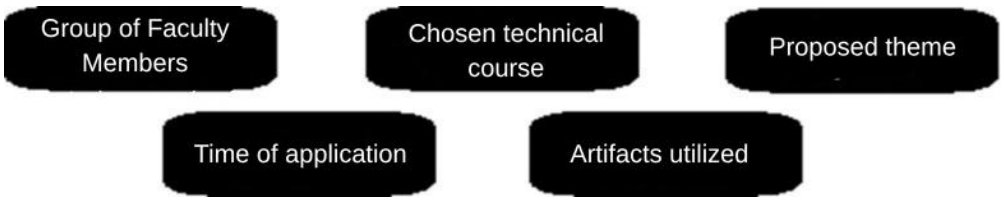
With the creation of integrated high school programs linked to vocational training, as proposed by the IFs, there arose a need to expand pedagogical possibilities, since this educational model emerged after the foundational assumptions of PHC had already been established. An educational methodology grounded in vocational training aimed at comprehensive education and offering a wide range of professional opportunities—as reflected in EMI programs—is much needed. It is within this perspective that Integrative Activities (AIn), methodological actions designed for EMI, seek to address the needs of this type of education.

According to Faria, Vaz, and Kruger (2023), for the development of an AIn, it is necessary to identify an integrated technical course at the secondary level and to assemble a group of faculty members who teach courses in this program, including at least one from the technical field. This perspective characterizes interdisciplinarity as an important aspect of AIn; however, it is necessary to emphasize that the faculty members involved must work collaboratively, making this not merely a multidisciplinary effort but a simultaneous action within the classroom.

Another aspect of AIn, as described by the authors, is that the activity must necessarily be contextualized within the world of work for which the technical course is designed to prepare workers. To achieve this comprehensively, it is recommended that a guiding theme be adopted to orient the participating faculty members.

There is no fixed hierarchical sequence for the implementation of each step; therefore, in Figure 3, we present a diagram, adapted by the authors, illustrating the points described for the structuring of AIn.

Figure 3: Necessary steps for AIn.



Source: Adapted from Faria, Vaz, Kruger (2023).

In light of the issues discussed, we can define the Integrative Activity as a specific methodological tool for vocational education, guided by a theme that addresses the professional context of the technical program. It is characterized by collaborative classroom activities led by teachers from different fields of knowledge who teach

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courses in the same semester, with at least one technical subject being mandatory, addressing the diverse aspects of work, seeking comprehensive training, and aiming to develop the maieutic worker.

The Integrative Activity, as a methodological tool for Professional and Technological Education, has proved effective across different fields. The method has already been applied in a technical computer science course, involving instructors in computer science, sociology, mathematics, biology, and chemistry (FARIA; VAZ; KRUGER, 2023), with excellent results. It was also implemented in a food technology program with instructors in food preservation, biology, philosophy, chemistry, and geography (FARIA; MORAIS; BARROS, 2024), in which the authors established an alignment between TO and AIn. The results obtained demonstrated that TO and AIn are didactically complementary as tools for EPT.

6 CORRELATIONS BETWEEN PROFESSIONAL EDUCATION, THEORY OF OBJECTIFICATION, AND INTEGRATIVE ACTIVITIES

Given that dialectical historical materialism serves as its philosophical foundation and Integrative Activity as its methodology, it stands to reason that EPT requires a pedagogy grounded in these same theoretical perspectives. It is precisely at this juncture that TO can be considered as a pedagogical option for EPT, particularly in the context of the Integrated High School at the IFs. It is also important to consider the possibility of incorporating TO into PHC, since Saviani (2013) himself affirms that his pedagogy is still under construction and, therefore, open to complementation.

The philosophical basis of TO is grounded in the idea that the human being, as a natural entity, is capable of transforming reality through work and social practices, which is supported by the ideas of Hegel and Marx. It also draws inspiration from Vygotsky's critiques of teacher-centeredness and the denial of students' capabilities, moving beyond authoritarian conceptions to allow for dialectical combinations. Another foundational element of TO is the understanding that education is a means to freedom, which Radford draws from Freire's conception of education (RADFORD, 2021).

AIn incorporates vocational training into its methodology, while TO posits that human labor is a transformative force. The collective effort and methodological mechanisms central to TO strongly align with the dialectical approach expected in AIn during teachers' collaborative activities and discussions among student groups. The communitarian ethics described by TO establishes a strong correspondence with the collaborative preparation of classes necessary for the creation of AIn. TO, therefore, possesses philosophical, psychological, educational, and methodological principles that are closely aligned with the fundamental principles of AIn as developed in integrated technical courses.

7 CONCLUSIONS

EPT, currently being implemented in the federal school network and requiring educational theories specifically tailored to integrated technical programs at the secondary level, can now draw on Theory of Objectification as its pedagogical foundation. Since TO was developed within the principles of dialectical-historical materialism, it is well positioned to align with vocational training, the genesis of EPT, and the rationale for developing AIn.

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A pedagogy grounded in collective principles, in which educational actions occur dialectically and are carried out by different actors, in accordance with the premises of TO, is readily compatible with an interdisciplinary approach, as is the case with AIn when applied to vocational training, which forms the basis of EPT.

While TO emphasizes collaborative work as an educational approach established by groups of students and the teacher, AIn employs a similar strategy, both in its AEA—developed by teachers from different fields of study—and in its implementation proposal, which aims to develop well-rounded workers.

Materialist philosophy is constituted by the perspective of human history; the historicity of a community shapes its own culture. For the encounter with knowledge—the object of TO—culture is an essential and inseparable part of the process. The culture of a social collectivity is associated with the contexts of that society, and AIn necessarily considers contextualization as the basis for conceiving work.

The search for a pedagogy that can address the specificities of EPT, a pursuit that has motivated much research in the field, may be nearing its conclusion. TO is especially suitable for this educational modality, shares the same philosophical principles, exhibits many methodological similarities, and, when combined with AIn, rests on methodological assumptions that complement each other. Dialectical historical materialism as a philosophical foundation, the Theory of Objectification as a pedagogical principle, and Integrative Activity as a methodological framework are three pillars that are fully complementary to the Professional and Technological Education currently being developed in Brazil.

Given the objective of this article—which was to analyze the alignment between TO and the theoretical and guiding principles of IFs, as well as the incorporation of TO as a pedagogical possibility in EMI—we believe that this theoretical discussion offers a pedagogy capable of addressing the specific needs of EPT, since TO proves to be particularly well-suited to this educational modality; it is grounded in the same philosophical principles, shares many methodological similarities, and, when combined with AIn, rests on methodological assumptions that complement one another.

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