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Vocational and Technological Education in Brazil: Historical Trajectory, Current Overview, and Perspectives for Society

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ABSTRACT

Professional and Technological Education (EPT) in Brazil is presented as a field of dispute between mere instrumental qualification for the market and comprehensive human training. Historically, the modality evolved from a welfare model in the 19th century (focused on the "underprivileged classes") to the strategic consolidation of Federal Institutes in 2008. This trajectory is marked by educational duality, which for decades separated technical education (manual labor) from preparatory education (intellectual work). In the contemporary scenario, the 2024 School Census points to a significant expansion in enrollment, driven by policies such as the New PAC and the Full-Time School Program. However, critical bottlenecks persist: regional inequality is pronounced, school dropout rates are recurrent, and only 17.2% of high school students have access to EFA, showing that quantitative expansion has not yet overcome historical socioeconomic barriers. From a pedagogical point of view, the text advocates overcoming fragmented teaching through transdisciplinarity and active methodologies. It proposes that technology should not be an end in itself, but a political and social tool. Strategies such as challenge-based learning allow students to connect technical knowledge, such as computer science or agroecology, to ethical, environmental, and citizenship issues. In short, strengthening EFA in Brazil requires that professional training keep pace with global technological transformations without abandoning the commitment to the emancipation of the individual. The ultimate goal is a necessary synthesis: to train professionals who master technical circuits, but who also understand and act on the circuits of social inequalities, transforming education into an instrument of justice and national sovereignty.

Keywords: professional training; citizenship; educational policies; technical education.

RESUMO

A Educação Profissional e Tecnológica (EPT) no Brasil é apresentada como um campo de disputa entre a mera qualificação instrumental para o mercado e a formação humana integral. Historicamente, a modalidade evoluiu de um modelo assistencialista no século XIX (focado nas "classes desprovidas") para a consolidação estratégica dos Institutos Federais em 2008. Essa trajetória é marcada pela dualidade educacional, que por décadas separou o ensino técnico (trabalho manual) do ensino propedêutico (trabalho intelectual). No cenário contemporâneo, o Censo Escolar de 2024 aponta uma expansão significativa nas matrículas, impulsionada por políticas como o Novo PAC e o Programa Escola em Tempo Integral. Contudo, persistem gargalos críticos: a desigualdade regional é acentuada, a evasão escolar é recorrente e apenas 17,2% dos alunos do Ensino Médio têm acesso à EPT, evidenciando que a expansão quantitativa ainda não superou barreiras socioeconômicas históricas. Do ponto de vista pedagógico, o texto defende a superação do ensino fragmentado por meio da transdisciplinaridade e de metodologias ativas. Propõe-se que a técnica não seja um fim em si mesma, mas uma ferramenta política e social. Estratégias como a aprendizagem baseada em desafios permitem que o estudante conecte o saber técnico, como a informática ou a agroecologia, às questões éticas, ambientais e de cidadania. Em suma, o fortalecimento da EPT no Brasil exige que a formação profissional acompanhe as transformações tecnológicas globais sem abdicar do compromisso com a emancipação do sujeito. O objetivo final é uma síntese necessária: formar profissionais que dominem os circuitos técnicos, mas que também compreendam e atuem sobre os circuitos das desigualdades sociais, transformando a educação em um instrumento de justiça e soberania nacional.

Palavras-chave: formação profissional; cidadania; políticas educacionais; ensino técnico.



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Introduction

Vocational and Technical Education (VET) in Brazil represents much more than a type of education focused on job training. It is a field of social, political, and pedagogical construction that reflects the historical and contemporary challenges of educating citizens and professionals. From its earliest experiences in the 19th century, when trade schools sought to prepare craftsmen to meet specific economic demands, to the consolidation of federal institutes in the 21st century (Santos and Marchesan 2017), VET has oscillated between the instrumental function of serving the market and the emancipatory dimension of training critical and conscious individuals.

The current scenario shows a significant expansion of the network and opportunities for technical training, but also highlights regional inequalities, gaps in alignment with the world of work, and challenges related to inclusion and diversity. Thus, analyzing EPT requires understanding not only its policies, structures, and statistics, but also the meanings attributed to it by educators and students, the pedagogical practices developed, and the obstacles faced in the articulation between technical training and citizenship.

This article therefore proposes to revisit the historical trajectory of EPT in Brazil, examine its contemporary landscape, and reflect on perspectives for its strengthening. The research seeks to understand how legacies, decisions, and past experiences shape the current configuration of professional education, offering insights for thinking about strategies that make EPT a space for comprehensive, critical, and socially relevant training.

Vocational and Technical Education (VET) in Brazil has a history marked by changes in its conception, objectives, and target audiences. From its origins linked to the preparation of labor for specific sectors to recent policies that seek to integrate it into general education, VET bears historical marks of educational inequality and duality between technical and preparatory education. Despite advances in recent decades, such as the expansion of the Federal Network and increased offerings at state and private institutions, structural challenges persist, such as regional inequality, school dropout rates, lack of alignment with the labor market, and gaps in the comprehensive education of students. This reality raises central questions:

- How does the historical trajectory of EFA in Brazil influence its current model?
- What advances and setbacks can be identified in the recent configuration of EFA?
- How can EPT simultaneously respond to the demands of the world of work and the formation of critical and reflective citizens?

Vocational and Technical Education (VET) in Brazil is not just an educational modality, but a field of dispute over social projects. Since its origins in the 19th century, when the first trade schools emerged to train craftsmen in a country that kept most of its population marginalized from access to knowledge, EPT has oscillated between two poles: on the one hand, technical training as a tool for adapting to immediate economic demands (Santos and Marchesan 2017). On the other, vocational education as a path to emancipation and citizenship. This tension, far from being resolved, is now being played out amid a scenario of rapid changes in the world of work, environmental crises, and profound educational inequalities.

The motivation to investigate this topic stems from a personal journey that spans the challenges and possibilities of public education. When, in adult education, I met teachers who understood that their students were not just individuals who needed to finish high school and obtain a diploma, but people with stories, jobs, children, and interrupted dreams. Then I understood that education is only effective when it dialogues with the concrete life of each student.



This experience raised the question of why EFA, which should be a privileged space for this articulation between knowledge and reality, still so often reproduces a fragmented model, in which the "technical" is dissociated from the "human," and where the curriculum sometimes leaves aside the knowledge of farmers, mechanics, and seamstresses who sustain this country. The question is not rhetorical. It echoes data from the 2024 School Census, which shows an increase in EFA enrollment, but also reveals that less than 20% of high school students have access to it, with a concentration in the most developed regions (Ministry of Education 2025d).

It is in this context that this research fits in. If, on the one hand, we have made progress with the proposal for a National EFA Policy and the expansion of federal institutes, on the other hand, structural challenges remain: how can we ensure that technical training is not reduced to preparation for the market? How can we reconcile the urgency of professional qualification with the need for an education that trains critical individuals, aware of life in society, like my colleagues in EJA who, even though tired from their daily work, found in the classroom a space for questioning, dialogue, and not just certification?

We believe that the answer lies in the history of EFA itself: a trajectory marked by advances and setbacks, but also by gaps where educators and students who believe that professional education can be both a right and a path to transforming Brazil have always resisted.

Investigating the historical trajectory, current landscape, and prospects of EFA is relevant because it allows us to understand how past legacies and decisions shape the present and impact the future of this type of education. In the contemporary scenario, marked by intense technological transformations, changes in the labor market, and growing demand for qualified professionals, EFA becomes strategic for economic and social development. Historical-critical analysis helps to identify continuities and ruptures, allowing public policies and pedagogical practices to be thought out in a more contextualized and effective way. In addition, reflection on the future prospects of EPT contributes to aligning professional training with the emerging demands of society, strengthening its social function and expanding opportunities for young people and adults across the country.

Thus, this article sought to examine the historical trajectory of Professional and Technological Education in Brazil to understand its current state and discuss prospects for its development.

Methodology

This research is based on a critical dialogue with existing academic production on Professional and Technological Education (EPT), both in Brazil and in international contexts. A literature review was chosen as a strategy to map, analyze, and problematize concepts, historical milestones, public policies, and pedagogical practices related to EPT.

The review process prioritized materials that addressed historical trajectories, pedagogical concepts, and contemporary experiences in technical and technological education. The critical approach adopted allows us to identify trends, continuities, and ruptures, as well as to reflect on the challenges and possibilities for strengthening PTE in the current scenario.

Throughout the survey, we sought not only to record information, but also to articulate interpretations, compare theoretical perspectives, and relate historical evidence to practical implications for professional and civic training. In this way, the literature review becomes an instrument of reflective analysis, offering insights for understanding EFA as a field of research and educational action.



Results and Discussion

Historical trajectory of EPT in Brazil

Vocational and Technical Education (VET) in Brazil has a long history, marked by different concepts, objectives, and target audiences over the centuries. Its roots date back to the colonial period, when training for work was developed on an ad hoc basis, linked to specific production demands. Among the most significant examples are the work apprenticeships carried out in the Foundries and Mint, as well as in the Brazilian Navy's Craftsmanship Learning Centers, especially during the gold cycle (Ministry of Education 2025a; 2025c).

During the imperial period (1822–1889), the creation of the Artisan Training Centers, established between 1840 and 1865 in ten provinces, stands out. Their purpose was to offer education and professional training to young people, often orphans or those in socially vulnerable situations. This policy highlighted the welfare role assigned to vocational education, aimed mainly at the “underprivileged classes” (Ministry of Education 2025a; 2025c; Castellanos 2023).

With the proclamation of the Republic, EPT became more clearly incorporated into national public policies. A fundamental milestone was the creation, in 1909, of 19 Schools for Apprentice Craftsmen, through Decree No. 7,566, of September 23, during the government of Nilo Peçanha. These institutions offered free primary and vocational education, forming the embryo of the future Federal Network of Professional, Scientific, and Technological Education (Cechin and Pilatti 2023; Gama 2015; Ministry of Education 2025a; 2025c).

Throughout the 1930s, vocational education gained new momentum, being incorporated into the agenda of the newly created Ministry of Education (1930) and recognized in the 1937 Constitution as a duty of the State. During this period, the institutionalization of the sector intensified, especially during the Vargas government, with the creation of the National Industrial Apprenticeship Service (SENAI) in 1942 and the National Commercial Apprenticeship Service (SENAC) in 1946. Also in this context, the Organic Laws of Industrial, Commercial, and Agricultural Education were enacted, which defined training cycles and consolidated the foundations of a federal network focused on technical qualification (Barón et al. 2024; Ministry of Education 2025a; 2025c).

In 1959, federal industrial and technical schools were transformed into autonomous entities, strengthening the administrative and financial autonomy of these institutions. Two years later, the first National Education Guidelines and Framework Law (LDB) allowed vocational education graduates to enter higher education, expanding opportunities for continuing studies (Ministry of Education 2025a; 2025c).

EPT reforms and reconfiguration (1960–2000)

The decades from 1960 to 1990 were marked by structural reforms that sought to align EFA with the country's economic and productive changes. During the military regime, there was an emphasis on rapid training geared toward market needs, with a strongly technical focus. In the 1980s, the scenario began to change with the advancement of technologies and the diversification of the economy, requiring greater integration between technical training and scientific knowledge (Afonso and Gonzalez 2016; Ministry of Education 2025a; 2025c).

The turning point for the 21st century was Law No. 11,892/2008 (Law No. 11,892, of December 29, 2008), which reorganized the entire Federal Network, integrating 31 Federal Centers for Technological Education (Cefets), 75 decentralized units (Uneds), 39 agrotechnical schools, seven federal technical schools, and eight schools linked to universities in the creation of the Federal Institutes of Education, Science, and



Technology. This measure expanded the range of courses offered, strengthened applied research, and consolidated the strategic role of EPT in regional and national development (Ministry of Education 2025a; 2025c).

In the following years, documents such as the National Education Plan (PNE), the National Common Core Curriculum (BNCC), and the New Secondary Education guidelines reinforced the importance of integrating technical and general education, seeking to overcome the historical duality between preparatory and vocational education. At the same time, the Federal Network began to cover the entire national territory, diversifying its activities and contributing to professional qualification and social inclusion (Ministry of Education 2025a; 2025c).

Thus, the trajectory of EFA in Brazil reveals a path that goes from social assistance to strategic development policy, without, however, losing sight of the historical challenges that still persist, such as regional inequality and the need to align training with the contemporary demands of the world of work (Fortes et al. 2023; Ministry of Education 2025a; 2025c).

Conceptual and legal aspects

Concepts of vocational education - Official documents and regulatory frameworks

Vocational and technological education (VTE) cannot be understood outside its historical and social context. We live in an era marked by technological revolution, which since the 1970s has radically transformed labor relations, knowledge production, and educational dynamics themselves. As Libâneo (2021) points out, education today plays a central role in economic development, requiring increasingly skilled and adaptable workers. In this scenario, digital technologies (DT), such as smartphones, computers, online platforms, among others, have not only changed the forms of social interaction but also expanded pedagogical possibilities, as Lévy (2010) has already pointed out. This reality demands continuous training, both for students and for teachers and administrators, who need to constantly update themselves to keep up with the rapid changes of the contemporary world.

In Brazil, Professional and Technological Education is institutionalized by the National Education Guidelines and Framework Law (LDB), Law No. 9,394/1996 (Resolution CNE/CEB No. 2, of January 30, 2012), as an educational modality focused on professional preparation. Its objective, however, goes beyond simple qualification for the labor market, seeking to integrate individuals not only into the world of work, but also into society. This is reflected in the diverse range of courses offered, from basic qualifications to technological postgraduate studies, always with a view to linking theory and practice (Law No. 11,892, of December 29, 2008).

An important milestone was Resolution CNE/CEB No. 2/2012, which established the National Curriculum Guidelines for Secondary Education. It reinforces the need for comprehensive training, integrating general and technical-professional knowledge, and linking education, work, science, technology, and culture (Resolution CNE/CEB No. 2, of January 30, 2012). This concept breaks with the reductionist view of professional education as a mere transmission of operational skills and aligns with the critical reflections of authors such as Frigotto (2007) and Frigotto, Ciavatta, and Ramos (2021), for whom PTE should train conscious citizens capable of critically intervening in social reality.

The very evolution of terminology, from "vocational education" to "Professional and Technological Education" (EPT), reflects a paradigm shift. Law No. 11,892/2008, which created the Federal Institutes of Education, Science, and Technology (IFETs), explicitly incorporated the technological dimension, broadening the scope to include higher education technology and postgraduate courses (Law No. 11,892, of December 29, 2008). The creation of these Federal Institutes represented a milestone in Brazilian



education by establishing a public network of excellence, committed not only to qualified technical training but also to sustainable regional development. Its pedagogical model was designed to simultaneously respond to local productive needs and national challenges of social inclusion through education.

However, the duality between general and professional education is not recent. As Santos and Marchesan (2017) discuss, its roots date back to the 19th century, when European society was divided between the bourgeoisie and the proletariat, each with a distinct type of education: one focused on critical thinking and management, the other on manual labor. This separation, criticized by Saviani (2003) as one of the contradictions of capitalist schooling, has been perpetuated in Brazil, where technical education has long been seen as an alternative path for the working classes.

In contemporary times, Professional and Technological Education has been consolidating itself as an educational model that transcends the old division between general and vocational training. By integrating technical and humanistic knowledge, this type of education takes on the dual commitment of qualifying students for the job market while developing critical awareness and the capacity for social intervention. More than just training competent professionals, its fundamental purpose is to educate citizens who are able to understand and transform both their working realities and the broader social context. In other words, it is an educational project that is still constantly evolving.

Current Overview of EPT in Brazil

Vocational and Technical Education (EPT) is undergoing a period of expansion and reconfiguration in Brazil, marked by both quantitative advances and structural challenges that demand critical reflection. Data from the 2024 School Census reveal significant growth: enrollment in the public school system increased by 229,000, reaching 1.57 million students, a jump 2.4 times greater than that recorded in the previous year. This movement is not random, but rather the result of deliberate policies, such as the Full-Time School Program, which injected R\$ 4.06 billion in federal funds between 2023 and 2024, and the New PAC Education, with plans for 102 new federal institute campuses and 140,000 priority technical places (Ministry of Education 2025d).

Despite this, the figures, although promising, do not hide historical contradictions. Goal 11 of the National Education Plan (PNE), which aims to triple EFA enrollment by 2025, remains distant: today, only 17.2% of regular high school students are enrolled in concurrent or integrated technical courses (Ministry of Education 2025b). Regional inequality persists, and access to qualified training is still a privilege enjoyed by few, as Ana Inoue, superintendent of Itau Educação e Trabalho, points out: "EPT does not reach everyone, and those most disadvantaged are young people in vulnerable socioeconomic situations" (Inoue 2024).

Two issues are at the heart of the current debate: the quality of provision and the integration of work and citizenship training. On the one hand, there are efforts to modernize the structure, such as the R\$ 1.4 billion allocated to laboratories, libraries, and student restaurants in federal institutes (Ministry of Education 2025d). On the other, initiatives such as the National EFA Policy (PNEPT) have emerged, developed by an Interinstitutional Working Group with the participation of productive sectors, social movements, and educational institutions (Inoue 2024). This policy, still under review by the MEC, signals an attempt to overcome the old paradigm of mere training for the market, incorporating demands for sustainability (as highlighted in the preparation for COP30) and inclusion (Inoue 2024).

The case of Piauí, where 37.5% of state schools already offer EPT in pursuit of total coverage, illustrates the transformative potential of this modality, but also its limits (Ministry of Education 2025e; Inoue 2024). After all, training agricultural technicians is not enough if the curricula ignore the knowledge of family



farmers; qualifying young people for IT is insufficient if the courses do not discuss the algorithms that perpetuate discrimination.

The current scenario, therefore, is one of cautious optimism. EFA is advancing in scale, but it needs to answer essential questions: how can the urgency of the labor market be reconciled with critical training? How can we ensure that expansion does not reproduce inequalities, such as those that marked my own trajectory, between dropping out of high school and rediscovering the meaning of education in adult education? Is EFA just an employability policy or an instrument of power for those who have always been marginalized from development projects?

Prospects and recommendations for EFA

Global trends and impacts on Brazilian EFA

Vocational and Technical Education (VET) in Brazil is at a crucial moment in its trajectory, torn between historic advances and the challenges imposed by a changing global scenario. The structural reforms implemented in recent decades, particularly with the creation of Federal Institutes by Law No. 11,892/2008, have consolidated a public model of excellence that seeks to reconcile technical and civic education (Law No. 11,892, of December 29, 2008. 2008). Despite this, as Motta and Frigotto (2017) warn, this project has been challenged by a movement of counter-reforms that threaten its integrative essence, especially after 2016 with the imposition of neoliberal policies in basic and professional education.

The global context brings additional pressures. The revolution in Information and Communication Technologies (ICTs), which according to the World Bank (2018) has become one of the main catalysts of contemporary economic growth, requires Brazilian EFA to adapt in two ways: on the one hand, to train professionals capable of working in increasingly complex digital environments; on the other, maintaining its commitment to reducing inequalities in a country where 30% of the population still does not have access to quality internet (ITU, 2017). This tension is clearly evident in the implementation of the BNCC and the *Novos Caminhos* program, which oscillate between meeting market demands and preserving the comprehensive education advocated by LDB 9.394/1996 (Law No. 9.394, of December 20, 1996 1996).

Three global trends emerge as particularly relevant to Brazilian EFA:

1. The digitization of production processes, which requires more flexible and interdisciplinary curricula, capable of articulating specific technical knowledge with cross-cutting digital skills (Pradhan et al. 2018).
2. The reconfiguration of work-education relationships, accelerated by the pandemic. As demonstrated by Araújo (2019) and Moura and Benachio (2021), the growing adoption of hybrid and remote models in professional training cannot simply replicate exclusionary logics, but must be guided by the principle of equity, especially in a country with deep regional asymmetries.
3. The emergence of new forms of digital exclusion, which transform access to technology into a new marker of inequality (Sepehrdoust 2018). Brazilian EFA needs to respond to this not only by training IT technicians, but also by ensuring that these professionals act as agents of technological democratization, especially in urban peripheries and rural areas.

Given this scenario, it is recommended that EFA in Brazil:

- Critically incorporate technological innovations, avoiding both technophobia and the uncritical adoption of fads, as warned by Evangelista, Shiroma, and Pelissari (2019; 2023) in their analysis of the "documentary position" of educational policies;



- Expand the mechanisms for integration between teaching, research, and extension in IFs, transforming them into centers of endogenous technological development;
- Strengthen international coordination, learning from the experiences of other countries, but adapting them to the Brazilian reality.

As Hansen's (1999) analysis applied to the Brazilian case demonstrates, this is a moment of "structural breakdown" in the trajectory of EFA. The choices made in this decade will determine whether it will consolidate itself as an instrument of emancipation or fall back into old dichotomies. The answer will depend on the ability to reconcile global demands with the historic project of free, quality public vocational education that has been under construction since the 19th century.

Possibilities for integration between technical training and citizenship training

Vocational and Technical Education (VTE) faces a historic dilemma: how to train competent technicians for the job market without reducing education to a mere study of content and formulas? How to reconcile productive efficiency with the training of critical individuals, capable of making their presence felt in society beyond their professional roles? This tension is not new, but it takes on a sense of urgency in the current scenario of rapid technological change and democratic crises.

Transdisciplinarity offers a fertile path to overcoming the fragmentation between "knowing how to do" and "knowing how to think" (Dieleman and Najera 2015). If technical specialization tends to isolate knowledge into watertight compartments, the transdisciplinary approach seeks to integrate it with life experiences, values, and lay knowledge. In their research, Dieleman and Najera (2015) cite the example of the Autonomous Metropolitan University of Mexico (UAM) and demonstrate that, by creating a "transdisciplinary core" in its engineering courses, the institution not only taught calculations and design, but also encouraged students to reflect on their role in society. A future civil engineer, thus, not only learns to calculate the strength of materials, but also to ask: Who will be impacted by this project? How can it reproduce or reduce urban inequalities? (Dieleman and Najera 2015).

However, this integration requires more than just curricular adjustments. Noula (2018) warns of the risk of reducing critical thinking to a "transferable skill," disconnected from political reality. The Crick Report, for example, lists skills such as "analyzing evidence" and "recognizing manipulation," but fails to link these skills to social transformation (Noula 2018).

In EFA, this reductionism can be observed, for example, in computer science courses, which teach how to operate software and develop systems, but rarely discuss how such technologies can reproduce social inequalities or gender and racial discrimination. Similarly, management training prepares students for team and process management, but rarely questions practices such as abusive outsourcing or the intensification of working hours and how they impact workers.

In this sense, challenge-based learning presents itself as a promising pedagogical alternative (Yoosomboon and Wannapiroon 2015). Its potential lies in replacing purely technical and decontextualized exercises with concrete problems. For example, the development of an application aimed at small farmers or the search for energy efficiency solutions in "disadvantaged" communities. In this approach, the "cloud" and social networks are no longer just tools for instrumental use but become spaces for collaboration, negotiation, and dispute over meanings (Yoosomboon and Wannapiroon 2015). Imagine, for example, a technical course in agroecology in which students:

1. Map land conflicts in a region (linking georeferencing and territorial rights);
2. Design irrigation systems with quilombolas (combining hydraulics and traditional knowledge);



3. Disseminate results on digital platforms (combining graphic design and environmental activism).

This approach not only qualifies students technically, but also politicizes and raises awareness in their training. As we see in the work of Dieleman and Najera (2015), citizenship is not taught with small pieces of information, but with practices that connect technical knowledge to social responsibility.

EPT, therefore, must answer two simultaneous questions: how to train an electrical technician capable of installing and maintaining electrical systems with quality and safety? And, at the same time, how to train a professional who is critical of situations such as the lack of personal protective equipment on construction sites or the hiring of services that violate labor standards?

The integration of technical training and citizenship training should not be understood as a simple "addition" of humanistic disciplines to the curriculum, but rather as a paradigm shift in the way EFA is conceived and practiced. This implies:

- Transdisciplinarity, to overcome the hierarchies that separate scientific and "popular" knowledge;
- Critical thinking linked to political action, and not just reduced to simple preparation for the job market;
- Active methodologies, such as project-based and challenge-based learning, capable of linking technology to the contradictions and demands of society.

In this way, EFA can overcome the dichotomy between functioning as a simple "labor factory" or getting lost in "idealistic discourse." Instead, as Paulo Freire (1991) thought, a necessary synthesis emerges, that of converting technique into a political act and politics into an act sustained by technique.

Pedagogical strategies for strengthening PTE

Vocational and Technical Education (VET) faces a double historical imperative: to prepare professionals capable of responding to the demands of a constantly changing labor market and, at the same time, to train critical, ethical, and socially engaged individuals. This task cannot be accomplished simply by updating curricula or introducing new digital technologies, but requires a profound restructuring of the pedagogical strategies that guide educational processes.

As Dewey and Del Rocio (1990; 2024) stated, education only becomes effective when it manages to engage organically with the problems of society. In this sense, EFA needs to break with fragmented and passive pedagogical models and move towards approaches that articulate cognition, affectivity, practical action, among others.

A first axis for strengthening EFA lies precisely in the adoption of active methodologies. Learning based on everyday problems, for example, shifts the student from the position of receiver to that of protagonist, by proposing real challenges that integrate technical, social, and environmental dimensions. Thus, instead of simply memorizing procedures, students in an electrical engineering course, for example, can be encouraged to design solar energy systems for vulnerable communities, combining knowledge of electricity, sustainability, and solidarity economy.

Similarly, rotating through workstations allows manual activities, such as assembling circuits or diagnosing engine faults, to be intertwined with debates about changes in the world of work, such as the impact of automation and robotization on employment. It is therefore a question of teaching not only how to do, but also how to think about "doing."



Another important aspect of EFA concerns the visual-perceptual and emotional dimensions of learning (Baldeón et al. 2024). Difficulties with visual perception, reading, and writing, among others, can significantly compromise student performance, especially for those from school- y contexts marked by structural inequalities (Baldeón et al. 2024). Therefore, multisensory strategies, such as the use of 3D simulators in architecture courses or tactile models in buildings, for example, can broaden access to technical knowledge.

In addition, methodologies that combine technique and emotion are equally fundamental: a nursing student, for example, can learn to read blood pressure charts not only through numerical abstraction, but also through patient narratives, humanizing the interpretation of data. This dimension is linked to the development of emotional management, so that discussion groups about frustrations during internships or insecurities about unemployment, for example, can contribute to training more resilient, ethical professionals who are aware of their social role.

At the center of this process, the teacher takes on the role of mediator, not just a transmitter of content. Beyond technical mastery, EPT teachers need continuing education that enables them to adopt critical and flexible teaching methods. Inspired by Paulo Freire (1991), a leading figure in Brazilian education, these teachers must recognize and understand that teaching is a craft, but also a political act.

Thus, the computer science instructor, for example, when teaching programming, can problematize algorithmic biases and their social implications. Similarly, assessment must go beyond measuring specific technical skills learned. Integrative projects, essays, and reflective reports allow for the documentation of both the practical evolution and critical thinking skills of students, as in the case of an agriculture student who records, at the same time, sustainable soil management practices and comparative analyses between family farming and agribusiness.

Finally, it is necessary to rethink the role of technology in EFA. Digital platforms, social networks, and specialized software should not be conceived simply as solutions in themselves, but as means for collaboration and the production of socially relevant knowledge. Especially nowadays.

Logistics students, for example, can use routing systems not only for student simulations, but also to optimize the distribution of donations in partnership with civil society organizations. In graphic design courses, digital tools can be used to create communication campaigns for local social movements, turning the pedagogical exercise into a concrete intervention in reality.

In short, strengthening EFA depends on a profound rethinking of its pedagogical strategies. Active pedagogy, perceptive inclusion, mediating teaching, and engaged technology are not only instrumental resources but also possibilities for emancipation. For education is not just about transmitting content but about awakening in students a passion and meaning for what they learn.

In the field of EFA, this means training electricians who not only master electrical circuits but also understand the circuits of inequality. Farmers who know how to manage the soil and, at the same time, defend social and environmental justice. In this context, technology ceases to be an end in itself and becomes a political act, capable of contributing to the construction of a more just, democratic, and supportive society.

Final Considerations

The historical trajectory of Professional and Technological Education in Brazil reveals a path marked by dualities and contradictions. From its origins in the Casas de Educandos Artífices (Houses of Artisan Students) in the 19th century to the consolidation of the Federal Institutes in the 21st century, EPT has oscillated between two poles: on the one hand, technical training as a tool for adapting to market demands. On the other, professional education as a path to social emancipation. This tension, far from being resolved,



persists in our current scenario, even in the face of quantitative advances expressed in the growth of enrollment and the expansion of the Federal Network.

This research, based on a critical review of the literature, enabled us to respond to the objectives outlined:

1. The review of historical milestones showed that the fragmentation between technical and humanistic education is the legacy of an educational project that, for centuries, segregated knowledge. This is a reflection of a society that separated "those who think" from "those who do";
2. Analysis of the current landscape confirmed that advances such as the PNEPT and PROEJA coexist with setbacks, such as the precariousness of teaching and curricula reduced to specific skills;
3. The perspectives discussed indicate that EPT will only respond simultaneously to the market and citizenship if it adopts integrative practices, such as the active methodologies analyzed.

The literature review showed that there is still a lack of studies linking history, policies, and pedagogical practices, especially on dropout rates and inclusive models. Therefore, it is recommended to:

- Investigating dropout rates in EFA based on trajectories such as mine, interrupted by work and lack of flexibility;
- Adapting international models (such as German dual training) to Brazilian regional inequalities;
- Testing strategies that integrate technology and equity in real contexts, as proposed by the PNEPT.

EPT remains a field of dispute. Its greatest challenge, however, is not technical, but political: to train professionals who, like my grandmothers Margarida and Maria, transform resistance into wisdom, capable not only of operating machines, but of reinventing the world of work.

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