

Teacher Work Intensification, Student Engagement, and School Infrastructure: Challenges to the Right to Learn in Brazil

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ABSTRACT: This article examines how teacher work intensification, weakened student engagement, and infrastructure inequalities interact in Brazilian basic education and affect teaching, learning, school retention, and equity. A critical narrative review with an integrative orientation, bibliographic and documentary in scope, was conducted using a qualitative approach. On 26 July 2026, purposive analytical searches using five explicit combinations of Portuguese and English terms were run in SciELO and ERIC, with complementary consultation of official portals. The final corpus comprised 58 sources: 40 scientific articles, seven legal acts, and 11 statistical, institutional, or technical documents, whose characterisation, categorisation, and evidentiary limits are set out in a matrix in Appendix A. Thematic analysis classified sources by construct, mechanism, evidentiary strength, and implication. The synthesis indicates that inadequate environments and insufficient resources increase work demands; pressure, insecure employment, and limited planning time constrain institutional capacity for student support; and experiences of failure, weak belonging, and difficulties in combining school and work may reduce student participation. These links are neither linear nor evidence of demonstrated causality. They are formalised as a five-proposition interpretive model that identifies mediators, moderators, and limitations. The study concludes that fulfilling the right to learn requires coordinated policies for equitable funding, professional recognition and occupational health, student retention, preventive maintenance, accessibility, and the pedagogical use of infrastructure.

KEYWORDS: right to education; teacher work intensification; school engagement; school infrastructure; educational inequality.

I. INTRODUCTION

Brazilian basic education is marked by a persistent contradiction. The legal framework recognises education as a right of all and a duty of the State and the family, links schooling to equal conditions of access and retention, and establishes the professional recognition of education workers and the assurance of quality standards as guiding principles. In practice, however, provision remains unequal across school systems, territories, educational stages, modalities, and social groups. The gap between the formal right and its everyday realisation is reflected in the time available for planning, the stability of employment relationships, the capacity to accommodate different needs, the condition of school environments, and students' ability to find meaning in their school experience (BRAZIL, 1988; BRAZIL, 1996).

The scale and diversity of the system preclude homogeneous descriptions. In 2025, the School Census recorded approximately 46 million enrolments in 178,800 basic education schools. This figure conveys the scale of the policy but does not capture the full variation in provision. Federal, state, municipal, and private schools have different resources and administrative capacities. Conditions also vary among central urban, peripheral, rural, Indigenous, Quilombola, and riverine schools, as well as schools serving students eligible for special education services. Because the Census is based on self-reported administrative data, an additional caveat is required: recording the existence of a resource does not ensure that it is well maintained, accessible, sufficient in quantity, or integrated into pedagogical practice (INEP, 2026a).

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In public debate, this complexity is often condensed into three images: exhausted teachers, disengaged students, and deteriorated schools. Although these images refer to recognisable problems, when considered in isolation they can support moralising explanations. Professional strain is reframed as a lack of vocation; student disengagement as laziness or indiscipline; and deficient infrastructure as an inconvenience that individual effort can overcome. This shift transfers responsibility from policies and institutions to individuals working and studying under pre-existing unequal conditions.

A scientifically responsible analysis must clearly delimit its constructs. Work intensification refers to an increase in the volume, complexity, or pace of tasks, the extension of work beyond contractual hours, and a reduction in workers' scope for control; it does not, in itself, constitute a clinical diagnosis (Oliveira, 2004; Assunção; Oliveira, 2009; Piovezan; Dal Ri, 2019). The World Health Organization classifies burnout as an occupational phenomenon resulting from chronic workplace stress that has not been successfully managed, rather than as a label for any form of tiredness (WHO, 2025). School engagement, in turn, comprises behavioural, emotional, and cognitive dimensions that may vary by activity, subject, period, and context (Fredricks; Blumenfeld; Paris, 2004; Wang; Degol, 2014). School infrastructure encompasses physical, sanitary, environmental, digital, and pedagogical conditions, together with maintenance, accessibility, adequacy, and effective use (Soares Neto et al., 2013; Alves; Xavier; Paula, 2019).

These three domains intersect in everyday school life. Temperature, ventilation, noise, and occupancy density may affect attention, comfort, and working conditions (Mendell; Heath, 2005; Wargocki; Wyon, 2017). Working across multiple classes and schools, together with expanding record-keeping and administrative demands, reduces the time available to support students and collaborate with colleagues (Gasparini; Barreto; Assunção, 2005; Araújo; Pinho; Masson, 2019). Repeated experiences of failure, weak belonging, discrimination, the need to work, and a limited perceived connection between the curriculum and life projects may undermine participation and school retention (Dayrell, 2007; Soares et al., 2015; Korpershoek et al., 2020). Each relationship is plausible and partially documented. The available literature, however, does not yet demonstrate either a uniform effect or a causal chain across all school systems.

National data help situate the problem. In TALIS 2024, Brazil participated in the surveys covering the early and later years of lower secondary education. Among teachers in the later years, 66% identified being held responsible for student achievement as a source of stress; 64% cited maintaining classroom discipline; 60% cited excessive marking; and 22% reported satisfaction with their salaries. Among full-time teachers, the results showed a self-reported average of 40.3 total working hours per week, including 9.3 hours of lesson preparation and 6.1 hours of marking assignments and tests, both above OECD averages. The national note estimates components of working time through separate questions; these components are therefore not recombined here as an additive accounting identity, nor is teaching time estimated as a residual. These are self-reported data, not clinical measures, and they should not be generalised to all professionals or educational stages (OECD, 2025a; OECD, 2025b; INEP, 2026b).

From the student perspective, the 2024 Continuous National Household Sample Survey-Education estimated that 8.7 million people aged 14 to 29 had not completed upper secondary education because they had dropped out or had never attended school. Among men in this group, 53.6% identified the need to work as the main reason. UNICEF data on out-of-school populations and age-grade distortion broaden understanding of educational trajectories but do not directly measure engagement. They function as contextual indicators of exclusion, delay, and the risk of disruption and must be interpreted alongside belonging, participation, effort, and pedagogical experience (IBGE, 2025; UNICEF, 2025a; UNICEF, 2025b).

The research question guiding this article is: through which mechanisms might teacher work intensification, weakened student engagement, and infrastructure inequalities be related in Brazilian basic education, and what implications does this articulation have for the right to learn? The objective is to integrate academic, statistical, and legal evidence; distinguish documented relationships from authorial inferences; and propose an interpretive model that can be subjected to empirical testing.

The intended contribution lies in analytical integration: organising a body of evidence dispersed across three fields and formulating five propositions concerning feedback mechanisms. Estimates of prevalence, effect size, or causal relationships fall outside the scope of the adopted design. The analysis addresses the coexistence of legal universality and stratified provision, whose concrete experience varies by school system, territory, race or colour, income, disability, gender, and family circumstances. The central argument is that socially referenced educational quality cannot be demanded as an outcome independent of the institutional means that make teaching, learning, and remaining in school possible.

II. METHODOLOGY

A. Design, Sources, and Search Strategy

This study is a critical narrative review with an integrative orientation, bibliographic and documentary in scope, and qualitative in approach. This designation is deliberate and reflects the need for consistency between the name of the design and the procedures undertaken. Its integrative character lies in the synthesis of studies using different designs and documentary materials to map concepts, mechanisms, and gaps (Whittemore; Knafl, 2005). The designation critical narrative review indicates that retrieval was purposive rather than exhaustive and that no item-level screening log was maintained. This prevents the study from being characterised as an integrative review in the strict sense, in which the search, deduplication, and exclusion pathway must be reproducible (Grant; Booth, 2009). The design therefore differs from a systematic review and meta-analysis: it does not estimate effect sizes, risks, or prevalence and makes no causal claims (Snyder, 2019).

The searches were conducted on 26 July 2026. SciELO and ERIC were selected for their complementary coverage: SciELO contains open-access scholarship with a strong Brazilian and Latin American presence in education and health, whereas ERIC extends coverage to international educational research. Publishers' webpages were used solely to verify metadata and DOIs, not as scientific databases. Documentary sources were located on the official websites of the Brazilian Presidency, INEP, IBGE, OECD, WHO, UNESCO, UNICEF, and the World Bank. The five search combinations, reproduced here for auditability, were:

Search 1: ("trabalho docente" OR "intensificação do trabalho") AND (saúde OR estresse OR burnout OR "condições de trabalho").

Search 2: ("student engagement" OR "school engagement" OR "school belonging") AND (education OR school).

Search 3: ("infraestrutura escolar" OR "school infrastructure" OR "physical learning environment") AND (aprendizagem OR desempenho OR equity).

Search 4: (financiamento OR CAQ OR accountability OR "avaliação externa") AND ("educação básica" OR school).

Search 5: (abandono OR evasão OR infrequência OR "school dropout") AND ("ensino médio" OR "secondary education").

Portuguese- and English-language publications issued between 2000 and July 2026 were considered. Pre-2000 studies were admitted when indispensable to conceptual development, as in the case of Finn's (1989) participation-identification model. No initial date limit was imposed on the documentary search because consolidated legal instruments, such as the 1988 Federal Constitution and the 1996 National Education Guidelines and Framework Law (LDB), remain essential to the analysis of educational rights.

The search was analytical and purposive rather than exhaustive. At the time of execution, no item-level record or export was retained for the retrieval, deduplication, and exclusion stages; retrospective counts of records retrieved, deduplicated, and excluded have therefore not been reconstructed. Reproducibility is provided at four levels: the search date and databases consulted, the exact search strings, the eligibility criteria, and the complete list of sources in the final corpus, supplemented in Appendix A by the analytical category, argumentative function, and evidentiary limitation assigned to each source. Accordingly, no PRISMA flow diagram is presented.

B. Eligibility Criteria and Corpus Composition

The review included peer-reviewed studies that defined at least one central construct or examined relevant mechanisms; technical syntheses with identifiable methods and institutional authorship; official statistics with explicit populations and time periods; and legal instruments in force concerning the right to education, funding, careers, federal coordination, or infrastructure. Inclusion also required a contribution to at least one analytical category and verifiable metadata.

The review excluded duplicates; articles confined to higher education with no mechanism transferable to basic education; opinion pieces lacking an identifiable method; promotional materials; local studies whose specificity did not support theoretical inference or comparison; and items with unverifiable authorship, date, or version. Local studies were retained when they offered relevant conceptual development, and no local finding was treated as nationally representative merely because the research was conducted in Brazil.

The final corpus comprises 58 sources. Forty scientific publications provide the conceptual and empirical foundation. Seven legal instruments delimit rights, duties, and policy mechanisms. Eleven statistical, institutional, or technical documents describe the scale of the system, trends, or evidence syntheses. This distinction is analytical: a law establishes normative content but not its implementation; descriptive statistics quantify an occurrence but do not explain its mechanism; and an observational study identifies a context-specific association but does not automatically establish causality. Appendix A characterises all 58 sources by analytical category, function in the argument, and evidentiary limitation.

TABLE I - Composition and Analytical Function of the Final Corpus

Source type	Number	Function in the study	Principal evidentiary limitation
Scientific articles	40	Define constructs and identify associations, mechanisms, and debates	Heterogeneity of designs, contexts, and measures
Legal instruments	7	Delimit rights, responsibilities, and public-policy mechanisms	Legal validity does not demonstrate implementation
Statistical, institutional, or technical documents	11	Describe trends, conditions, and guidance	Aggregate or self-reported data do not explain causality
Total	58	Support the critical narrative synthesis	Does not constitute a probabilistic sample of the literature

Source: Prepared by the author.

Note: Three of the 40 scientific articles (Grant and Booth, 2009; Snyder, 2019; Whittemore and Knafl, 2005) form part of the methodological framework and are not classified within the five analytical categories. The substantive scientific base therefore comprises 37 items.

C. Analytical Procedure, Quality, and Reflexivity

The material was read in three passes. The first recorded the object, population, design, concept, and principal result. The second classified the sources into five categories: rights and socially referenced quality; work organisation and health; engagement, belonging, and educational trajectory; infrastructure and learning environment; and coordination, funding, and implementation. The third extracted connections among categories, identifying the mechanism, expected direction, mediators, moderators, and strength of support.

A qualitative grading of support was adopted and operationalised in Table II. Classification was performed by a single reviewer, the author, without inter-coder agreement estimates. Divergences within the corpus were interpreted in light of study design, population, level of analysis, and correspondence between indicator and construct. When classification between two categories was uncertain, the more conservative category was applied. The limitation arising from single-reviewer coding is revisited in Section IX. To enable external auditing, the rubric is reported in Table II, while the analytical category, argumentative function, and evidentiary limitation assigned to each source are provided in Appendix A. The two levels must be distinguished: the grading of support in Table II applies to mechanisms in the model and is summarised in Table III; Appendix A characterises individual sources, which are not independently assigned labels of evidentiary strength.

TABLE II - Operational Criteria for Classifying the Strength of Support

Category	Operational criterion	Decision rule
More consistent	Convergence of at least two independent scientific sources, including a synthesis, longitudinal study, or multi-site investigation, with no material contradiction in the corpus	Applied to relationships repeated across different designs or contexts
Moderate	At least two scientific sources or one high-quality synthesis, but with indirect, context-dependent, or heterogeneous evidence	Applied when the direction is plausible but its magnitude or transferability remains uncertain
Propositional	A relationship inferred by integrating separate bodies of literature, with no direct study simultaneously measuring both sides of the mechanism	Applied as a theoretical hypothesis to be tested, not as a causal finding

Source: Prepared by the author.

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Two expressions in the rubric require explicit definition because they involve qualitative judgement. In this article, a high-quality synthesis means a systematic review or meta-analysis that reports its search strategy, eligibility criteria, and limitations and describes heterogeneity across included studies; syntheses omitting any of these elements were treated as indirect evidence. A material contradiction means a finding within the corpus that reverses the direction of the proposed relationship or nullifies it in comparable populations. Variation in magnitude across contexts does not, by itself, constitute a material contradiction and was recorded instead as context dependence.

Two publications associated with the curriculum vitae reported by the author were retained because they met the same eligibility criteria as the remaining sources: one addresses professional recognition and teacher health, and the other curricular fragmentation. They are cited only alongside independent literature and receive no privileged evidentiary weight (Oliveira et al., 2026; Camilo et al., 2026). This circumstance is disclosed as potential self-citation.

III. SOCIALLY REFERENCED QUALITY AND THE RIGHT TO LEARN

Article 205 of the Federal Constitution defines education as a right of all, directed towards the full development of the person, the exercise of citizenship, and preparation for work. Article 206 links this right to equal access and retention, professional recognition of education workers, and the assurance of quality standards. The LDB reaffirms these principles and allocates responsibilities among the Federal Government, the states, the Federal District, and municipalities (BRAZIL, 1988; BRAZIL, 1996). The right is not limited to enrolment. It requires opportunities to learn, conditions for remaining in school, participation, and responsiveness to difference.

Dourado and Oliveira (2009) characterise educational quality as historically contingent, polysemic, and dependent on factors both within and beyond the school. Income, housing, food security, health, transport, and access to cultural goods affect the possibility of learning. Management, curriculum, pedagogical relationships, resources, and working conditions shape what a school can provide. Socially referenced quality combines outcomes, processes, and the distribution of conditions, rejecting both the idea that tests encompass the purpose of schooling and the notion that external factors release the education system from responsibility.

Indicators of learning and student progression are relevant but require contextual interpretation. Accountability policies may increase visibility and focus while also generating curricular narrowing, teaching to the test, or displacement of responsibility when consequences are imposed without corresponding support (Brooke, 2006; Bonamino; Sousa, 2012). Freitas (2012) warns that importing corporate solutions and intensifying pressure for results can reconfigure public purposes. These effects are not inevitable; they depend on assessment design, the use of data, incentive structures, and the capacity to provide support.

Federalism introduces unequal capacities. Municipalities are responsible for much of early childhood education and the initial years of primary education; states concentrate provision in the later years and in upper secondary education; and the Federal Government performs regulatory, redistributive, and supplementary functions. Cooperation takes place within a heterogeneous federation in which national arrangements coexist with markedly different fiscal, administrative, and technical capacities (Segatto; Abrucio, 2016). The permanent Fund for the Maintenance and Development of Basic Education and the Valorisation of Education Professionals (Fundeb), regulated by Law No. 14,113/2020, increased federal supplementation and established redistributive mechanisms. On its own, however, it neither eliminates within-system differences nor guarantees that every school reaches adequate conditions (BRAZIL, 2020; Farenzena; Pinto, 2024).

Funding is necessary but not sufficient. Constitutional earmarking and Fundeb sustain provision, while the debate surrounding the Quality Student Cost standard (CAQ) seeks to relate resources to inputs and actual conditions rather than merely to accounting averages (Pinto, 2018). The creation of the National Education System (SNE) by Complementary Law No. 220/2025 established intergovernmental negotiation bodies and included agreements on minimum quality standards, technical and financial assistance, and the CAQ methodology. Its equalising potential will depend on regulation, comparable data, social participation, and local implementation capacity (BRAZIL, 2025).

The 2026-2036 National Education Plan (PNE) also links quality to verifiable conditions. Article 22 addresses minimum conditions for operation and health and safety, the reduction of inequalities, and national quality standards. Article 25, paragraph 2, item I, provides for progressive levels of provision, ranging from critical conditions to higher standards. Strategy 19.4, in more specific terms, requires the definition of minimum, basic, and adequate levels and includes a minimum amount of space per student. These are complementary normative layers rather than a single undifferentiated classification. The plan also establishes the National School Infrastructure Programme and provides for the contextualisation of educational outcomes, but its effectiveness requires that objectives be converted into costs, responsibilities, timetables, and public monitoring (BRAZIL, 2026a).

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Accordingly, the right to learn serves in this article as both a normative and analytical criterion. It enables inquiry not only into whether a student is enrolled or has achieved a given result, but also into whether the school has the conditions required to teach, support, include, and protect. It also permits assessment of whether the distribution of resources reduces or reproduces disadvantage. From this perspective, teaching work, engagement, and infrastructure cease to be peripheral variables and become integral to the meaning of quality itself.

IV. TEACHER WORK INTENSIFICATION AND OCCUPATIONAL STRESSORS

Teaching combines intellectual, relational, emotional, and organisational work. It involves subject-matter knowledge, planning, assessment, group management, communication with families, record-keeping, and collaboration. Reforms, enrolment expansion, external assessments, digital platforms, and new inclusion-related demands may increase complexity without proportionate increases in time, staffing, or autonomy. The restructuring of teaching work in Brazil has been associated with flexibilisation, precarious employment, and expanded responsibilities (Oliveira, 2004; Piovezan; Dal Ri, 2019).

Intensification does not merely mean spending more hours at school. It includes compressing more tasks into the same period, switching rapidly between activities, responding outside contractual hours, teaching across several classes or schools, and addressing problems for which specialised teams are unavailable. Assunção and Oliveira (2009) connect intensification and health by showing how working conditions mediate distress. Gasparini, Barreto, and Assunção (2005) highlight the effects of the work environment and organisation, while Araújo, Pinho, and Masson (2019) synthesise evidence of persistently high demands, voice disorders, and psychological distress among Brazilian teachers.

Reviews and group comparisons reinforce the conclusion that distress and illness cannot be attributed to personal weakness. In the Brazilian literature, Diehl and Marin (2016) identify recurring relationships among overload, lack of recognition, indiscipline, poor conditions, and mental ill-health. Silva, Bolsoni-Silva, and Loureiro (2018) examine burnout and depression among teachers and report correlations that warrant attention but do not justify treating every stress indicator as a diagnosis. A publication aligned with the curriculum vitae reported by the author likewise discusses overload, psychological distress, and professional retention; it is used here without replacing the independent body of evidence (Oliveira et al., 2026).

TALIS provides self-reported evidence about the work environment, not clinical prevalence. In addition to the stressors cited in the Introduction, the Brazil country note reports that 64% of teachers in the later years held permanent contracts, 72% worked part-time (defined as up to 90% of full-time hours), and 44% were satisfied with their employment terms. Cross-country comparisons must account for institutional differences, and national averages conceal inequalities by school system, contract type, location, and educational stage. Nevertheless, the findings suggest that recognition, stability, accountability, and workload form a relevant cluster for investigation (OECD, 2025a; OECD, 2025b; INEP, 2026b).

Internationally, the Global Report on Teachers links the sustainability of the profession to training, working conditions, professional voice, remuneration, and retention capacity. The report does not provide a clinical estimate for Brazil, but it reinforces the understanding that shortages and retention are matters of policy and work organisation rather than merely individual choice (UNESCO; INTERNATIONAL TASK FORCE ON TEACHERS FOR EDUCATION 2030, 2024).

The national professional salary floor has a protective role but does not encompass professional recognition as a whole. Law No. 15,437 of 18 June 2026 set the 2026 amount at BRL 5,130.63 and redefined the professionals covered by the floor. Teaching and pedagogical support had already been included in the legal definition since the original wording of Article 2, paragraph 2, of Law No. 11,738/2008. The substantive 2026 amendments expressly included early childhood teachers, recognised the principle that care, play, and education are inseparable, made the floor payable regardless of job title or function, and extended it to professionals employed under fixed-term contracts. The annual adjustment must be published by the Ministry of Education by the last working day of January and is calculated from the previous year's National Consumer Price Index (INPC) plus 50% of the average real change, over the preceding five years, in state, Federal District, and municipal contributions to Fundeb. The adjustment may be neither lower than the INPC nor higher than the nominal change in Fund revenues calculated under the terms set by the law. The statute also requires annual calculation records in open-data format and updates its constitutional basis to Article 212-A, item XII (BRAZIL, 2008; BRAZIL, 2026b). Compliance with the salary floor must be accompanied by career structures, adequate working conditions, and fiscal sustainability.

The 2026-2036 PNE provides for an intersectoral occupational health policy in Strategy 17.17, covering reduced absenteeism, prevention, care, comprehensive and occupational health, physical, mental, and emotional integrity, illness, violence, harassment, prejudice, and discrimination. Strategy 17.16 broadly encourages teachers to work in a single school; Strategy 6.10 contains a convergent provision specific to full-time schools (BRAZIL, 2026a). The limit of no more than two-thirds of working hours for activities involving direct interaction with students is not an innovation introduced by the plan: it is established in Article 2, paragraph 4, of Law No. 11,738/2008 and remains the legal parameter for composing teachers' working time. Non-classroom time is therefore an already regulated right rather than a programmatic aspiration (BRAZIL, 2008).

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Non-classroom time is a pedagogical condition. Planning, assessment, record-keeping, study, and the coordination of support require protected periods. When urgent demands and fragmented routines consume this time, standardised responses, delayed feedback, and reduced collaboration become more likely. This does not mean that additional time automatically produces better teaching. The quality of its use depends on management, training, access to data, professional trust, and material conditions. The relationship is mediated rather than mechanical.

Employment stability also requires careful treatment. Fixed-term contracts may address legitimate needs, but high turnover impairs continuity, community ties, and institutional memory. Professional recognition can therefore be organised into four interrelated dimensions: remuneration and career structure; working time and work organisation; autonomy, training, and participation; and health prevention and care. No single dimension fully compensates for the absence of the others.

V. STUDENT ENGAGEMENT, BELONGING, AND EDUCATIONAL TRAJECTORIES

School engagement is a multidimensional construct. Its behavioural dimension involves attendance, participation, and task completion; its emotional dimension includes belonging, interest, and interpersonal bonds; and its cognitive dimension concerns investment, self-regulation, and willingness to understand complex ideas (Fredricks; Blumenfeld; Paris, 2004). Wang and Degol (2014) further argue that engagement changes over time and results from interactions among student characteristics, relationships, instruction, and school organisation. It is a time-varying state, distinct from mere compliance with school routines.

The participation-identification model suggests that participation in school activities may strengthen identification with school, whereas failure and progressive withdrawal may generate the reverse process (Finn, 1989). This formulation helps explain gradual processes but should not be treated as a universal sequence. Support from teachers, peers, and families may alter trajectories, and its effects vary by developmental stage and context (Wang; Eccles, 2012).

Belonging warrants particular attention because it is associated with academic, motivational, behavioural, and socio-emotional outcomes. Meta-analyses report consistent, though heterogeneous, relationships between belonging and a range of outcomes (Allen et al., 2018; Korpershoek et al., 2020). These associations do not imply that symbolic interventions can replace resources or instruction. Belonging is produced through recognition, safety, trustworthy relationships, fair expectations, participation, and a genuine opportunity to learn.

In Brazil, young people's experiences are shaped by inequality and by disputes over the role of upper secondary education. Dayrell (2007) criticises the tendency to treat youth as a homogeneous category and shows how schools participate in the construction of youth experience. Krawczyk (2011) discusses challenges concerning the identity, expansion, and meaning of upper secondary education. Brenner and Carrano (2014) examine the meanings young people attribute to being at school, showing that the school relationship cannot be reduced to a simplistic opposition between interest and disinterest.

Curricular fragmentation and excessive compartmentalisation may hinder connections between knowledge and experience, particularly where coordination and integrative projects are lacking. The publication associated with the curriculum vitae reported by the author addresses this loss of meaning and was included alongside the literature on youth and engagement without independently supporting the conclusion (Camilo et al., 2026). The problem cannot be solved by replacing systematised knowledge with enjoyable activities. Curricular relevance means demanding intellectual access, contextualisation, coherent progression, and scope for student authorship.

Dropout, school leaving, irregular attendance, age-grade distortion, and non-completion are related but distinct phenomena. Soares et al. (2015) identify factors associated with dropout in public upper secondary education, including prior educational trajectory, employment, and family circumstances. IBGE and UNICEF data quantify disruptions and delays but are not engagement scales. In this article, they are treated as indicators of trajectory and context that can signal risk and inequality but are insufficient to infer emotional or cognitive states (IBGE, 2025; UNICEF, 2025a; UNICEF, 2025b).

The need to work illustrates this distinction. A student may value school yet be absent or drop out because of incompatible schedules, income needs, transport constraints, or family care responsibilities. Conversely, physical presence does not guarantee cognitive investment. Active outreach policies are important for locating and reconnecting students, but they must be accompanied by social protection, a welcoming school response, learning recovery, and individual support. The record of 300,000 returns supported by the School Active Search initiative demonstrates mobilisation capacity, not an isolated causal estimate of the programme's effect (UNICEF, 2025a).

Climate events add an increasingly important mechanism. Disruptions caused by floods, heatwaves, droughts, or storms affect school calendars, travel, safety, and continuity. UNICEF estimated that classes for 1.17 million students in Brazil were interrupted by climate events in 2024. This figure does not measure engagement, but it shows how external conditions and resilient infrastructure may alter opportunities for participation (UNICEF, 2025c).

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Strengthening engagement requires monitoring capable of distinguishing signs from causes. Attendance and assignment completion are useful indicators but should be combined with listening to students about belonging, relationships, safety, learning challenges, and life projects. The pedagogical response must avoid automatically punishing students who already experience cumulative disadvantage. The purpose is to identify barriers, provide support, and rebuild relationships without lowering academic expectations.

VI. SCHOOL INFRASTRUCTURE, INEQUALITIES, AND PEDAGOGICAL USE

Infrastructure is an active educational condition: it shapes what a school can provide rather than merely serving as a backdrop. It includes water, sanitation, energy, accessibility, safety, lighting, acoustics, ventilation, thermal comfort, furniture, reading, sports, science, and food-service spaces, connectivity, and equipment. It also includes maintenance and usability. A closed library, unstable network, or laboratory without supplies may formally exist while remaining pedagogically unavailable.

Soares Neto et al. (2013) proposed a scale for measuring infrastructure and documented inequalities among Brazilian schools. Alves and Xavier (2018) developed multidimensional indicators for primary and lower secondary education, while Alves, Xavier, and Paula (2019) formalised a conceptual model attentive to availability, adequacy, and conditions of provision. Alcantara (2025) updates the national measurement effort. Taken together, these studies show that a binary indicator of presence is insufficient and that infrastructure should be examined across dimensions and levels.

Material inequality is also associated with learning. Vasconcelos et al. (2021) discuss relationships among infrastructure, investment, and achievement. Xavier, Alves, and Petrus (2024) show that quality of provision and inequalities in learning must be analysed jointly. These findings do not support the claim that constructing a facility will, by itself, produce a particular gain. Effects depend on distribution, maintenance, pedagogical use, training, and interactions with social composition and school organisation.

The international literature converges on several environmental mechanisms. Reviews associate pollutants, ventilation, and thermal conditions with health, comfort, and performance, although study designs and measures vary (Mendell; Heath, 2005; Wargocki; Wyon, 2017). Uline and Tschannen-Moran (2008) discuss relationships among facility quality, school climate, and outcomes. The World Bank synthesis organises evidence on design, safety, comfort, and learning and emphasises the need to connect physical investment with management and educational use (Barrett et al., 2019).

An inadequate environment may increase the effort required to complete routine tasks. Excessive heat, noise, lack of water, damaged furniture, unsafe circulation, or unstable connectivity require improvisation, narrow the range of teaching practices, and interrupt activities. For students with disabilities, architectural, communication, and technological barriers may turn formal enrolment into restricted participation. For staff, the same environment may increase physical, vocal, and emotional strain (Gasparini; Barreto; Assunção, 2005; Mendell; Heath, 2005; Wargocki; Wyon, 2017; Barrett et al., 2019).

The effects are unevenly distributed, although this review documents inequality by reference to the measurement literature rather than through its own dispersion indicator, ratio between strata, or territorial breakdown; constructing such an indicator forms part of the research agenda in Section IX. School systems with lower fiscal and technical capacity may face higher logistical costs, difficulties designing and supervising construction, and greater dependence on transfers. Rural, Indigenous, and remote schools have specific requirements that should not be assessed solely against an urban standard. Equity requires a national core of rights accompanied by territorial adaptations and technical assistance (Soares Neto et al., 2013; Alves; Xavier; Paula, 2019; Alcantara, 2025).

Initial investment without maintenance leads to accelerated deterioration. Asset planning must map criticality, life-cycle cost, accessibility, climate risks, and actual use. Preventive maintenance tends to be less politically visible than opening new facilities, but it protects safety and continuity. Public systems for inventories, inspections, and prioritisation can make spending more transparent and reduce purely reactive decisions (Barrett et al., 2019; BRAZIL, 2026a).

Connectivity illustrates the difference between availability and use. General internet access does not reveal speed, stability, internal coverage, the number of devices, technical support, accessibility, or curricular integration (INEP, 2026a; Barrett et al., 2019). Digital policies must address the entire system: connectivity, local networks, equipment, training, data protection, and pedagogical design. A further labour effect remains under-measured. Lima (2021) argues that the digitalisation of educational administration may generate augmented bureaucracy by transferring previously intermittent records, accountability procedures, and control routines to platforms and increasing the administrative burden on teachers. The argument is theoretical and was developed from the Portuguese context, so its transfer to Brazil remains a hypothesis: introducing platforms without protected time, technical support, and teacher participation may add administrative work rather than simplify it. Because this proposition has not been directly measured in Brazil, it is included in the research agenda in Section IX.

VII. THE PRECARIETY CIRCUIT AS AN INTERPRETIVE MODEL

The "precarity circuit" is proposed as an interpretive model, not as a demonstrated causal finding. It organises connections identified in bodies of literature that frequently develop in isolation. Its unit of analysis is a school situated within a school system and territory and shaped by policies, resources, relationships, and social characteristics. The model does not assume that every difficulty begins at the same point or follows the same sequence.

The formulation engages with cumulative advantage and disadvantage theory, according to which initially small differences may grow through repeated exposure and institutional responses that distribute opportunities unequally (DiPrete; Eirich, 2006). The circuit draws from this tradition the concepts of non-linearity and accumulation but specifies school-level mechanisms connecting material conditions, work organisation, and engagement, as well as policy moderators capable of interrupting feedback loops. It therefore claims not an entirely novel theory but a context-specific integration of domains rarely measured within the same research design.

The first connection links infrastructure and work. Inadequate environments, unstable resources, and lack of support increase the need for adaptation and reduce predictability. This mechanism is supported by the environmental literature and research on teachers' working conditions (Gasparini; Barreto; Assunção, 2005; Mendell; Heath, 2005; Araújo; Pinho; Masson, 2019). The second connection links work organisation and pedagogical capacity. Heavy workloads, multiple functions, and little protected time may constrain planning, feedback, and collaboration, as indicated by studies of intensification (Assunção; Oliveira, 2009; Piovezan; Dal Ri, 2019).

The third connection relates support capacity to engagement. Teacher support and the quality of relationships are associated with engagement and belonging, although direction and magnitude depend on context (Wang; Eccles, 2012; Allen et al., 2018). The fourth links student trajectories to the complexity of teaching work. Irregular attendance, accumulated learning gaps, and heterogeneous needs require differentiation, coordination, and additional support. The literature on dropout and youth offers partial support, but longitudinal studies integrating measures of work and engagement are still needed (Brenner; Carrano, 2014; Soares et al., 2015).

The fifth connection operates at the systemic level. Decontextualised outcomes may generate pressure and narrow responses, particularly where support capacity is lower. Assessment can serve a diagnostic function when linked to resources and training or intensify asymmetries when tied exclusively to accountability (Brooke, 2006; Bonamino; Sousa, 2012; Freitas, 2012). Funding and federal coordination moderate all connections by shaping the capacity to prevent, support, and correct inequalities (Pinto, 2018; Farenzena; Pinto, 2024).

TABLE III - Evidence Matrix for the Precarity Circuit

Proposed mechanism	Evidence used	Key sources	Strength and interpretation
Inadequate environments increase effort and interruptions	Studies of environmental conditions, infrastructure, and teacher health	Mendell and Heath (2005); Soares Neto et al. (2013); Araújo, Pinho, and Masson (2019)	Moderate; integrated national measures are lacking
Intensification reduces time and scope for student support	Studies of restructuring, workload, and working conditions	Oliveira (2004); Assunção and Oliveira (2009); Piovezan and Dal Ri (2019)	Moderate; intensification is well documented, but the pedagogical effect is indirect
Lower support and belonging weaken engagement	Reviews and studies of support, belonging, and participation	Wang and Eccles (2012); Allen et al. (2018); Korpershoek et al. (2020)	More consistent; magnitude depends on context
Disrupted trajectories increase pedagogical complexity	Studies of dropout, youth, and inequality	Krawczyk (2011); Brenner and Carrano (2014); Soares et al. (2015)	Propositional; the work-engagement connection requires direct testing
Unsupported accountability may reinforce narrow responses	Literature on assessment and accountability policies	Brooke (2006); Bonamino and Sousa (2012); Freitas (2012)	Moderate; contingent on policy design

Source: Prepared by the author.

The model gives rise to five testable propositions:

P1. The greater a school's physical and operational inadequacy, the greater the expected demand for teachers to adapt their work, controlling for educational stage, school size, territory, and social composition.

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P2. The relationship between work intensification and weakened pedagogical support is mediated by non-classroom time, staff stability, autonomy, and multidisciplinary support.

P3. Teacher support, relational safety, and belonging mediate part of the relationship between institutional conditions and behavioural, emotional, and cognitive engagement.

P4. Irregular attendance, learning gaps, and disrupted trajectories increase pedagogical complexity, but their effects on teaching work are moderated by class size, collaboration, and early-intervention capacity.

P5. Equitable funding, technical assistance, and the formative use of assessment weaken the circuit, whereas unsupported accountability and low state capacity may intensify it.

The propositions distinguish better-documented components from inferences that remain open. P1 and P2 draw on adjacent fields but are rarely measured within the same design. P3 has a more consolidated international evidence base on belonging and support. P4 is the least directly tested connection. P5 combines the literature on education policy and institutional design. The model should be examined through longitudinal and multilevel studies that simultaneously measure the environment, work organisation, belonging, participation, and learning.

Moderators can interrupt adverse trajectories. Distributed leadership, collaboration, stable teams, social support, student participation, timely maintenance, and income protection change experiences even in difficult contexts. Selection effects and reverse causality are also possible: schools with poorer outcomes may receive more resources; staff experiencing illness may perceive their environment differently; and low engagement may increase teacher demands at the same time that low support further weakens engagement. These possibilities prevent the circuit from being interpreted as destiny.

VIII. IMPLICATIONS FOR PUBLIC POLICY

The recommendations were ordered by strength of support and level of federal responsibility, with each group indicating the corresponding row of Table III. Two caveats guide interpretation. Normative priority and evidentiary strength are distinct criteria: a measure may be legally mandatory while relying on a mechanism classified as moderately supported. Moreover, only one row in Table III was classified as more consistently supported, namely the relationship involving support and belonging; no other recommendation should be regarded as evidentially equivalent. The highest priority group combines measures with a direct legal basis and convergent evidence: ensuring minimum operating, health, and safety conditions; protecting paid planning time; complying with salary-floor and career provisions; monitoring attendance and providing early support; and distributing funding according to need. The Federal Government, states, and municipalities share responsibilities, but the Federal Government has redistributive and coordinating roles, while state and municipal systems manage and implement policy on a daily basis (Pinto, 2018; Farenzena; Pinto, 2024; Segatto; Abrucio, 2016; BRAZIL, 2025; BRAZIL, 2026a).

For infrastructure, the Federal Government should negotiate standards, criticality criteria, transfers, and technical assistance within the SNE. States and municipalities should maintain inventories, multi-year plans, and inspection routines. The initial priority is to eliminate conditions that compromise water, sanitation, safety, energy, accessibility, and environmental comfort. Laboratories, libraries, and technology should be expanded together with operating, training, and maintenance budgets. This hierarchy follows the PNE's progressive approach and avoids distributing equipment where basic conditions remain deficient. This group corresponds to the first row of Table III and has moderate support (Alves; Xavier; Paula, 2019; Barrett et al., 2019; BRAZIL, 2025; BRAZIL, 2026a).

For teaching work, measures with a direct legal basis and moderate support in the matrix, corresponding to the second row of Table III, include genuinely protected non-classroom time, reduced fragmentation across schools, stable processes, and administrative systems that eliminate duplicate record-keeping. Non-classroom time is enforceable under Article 2, paragraph 4, of Law No. 11,738/2008, even though the matrix classifies the pedagogical effect of expanding it as indirect. Occupational health policies must integrate risk surveillance, prevention, support, work adaptation, and assisted return to work without individualising organisational problems. PNE Strategy 17.17 provides a legal basis, but implementation should generate indicators of environment and organisation rather than merely count leave episodes (Assunção; Oliveira, 2009; Araújo; Pinho; Masson, 2019; BRAZIL, 2026a). For student retention, active outreach and attendance monitoring should function as entry points rather than complete policies. School systems need to combine communication with families, social protection, transport, meals, learning recovery, guidance, and responsible flexibility for working students. Evidence is stronger for the importance of support and belonging, the only row in Table III classified as more consistently supported, than for any single intervention package. Before scaling, projects should therefore define their target population, expected mechanism, process indicators, and outcomes (Wang; Eccles, 2012; Soares et al., 2015; Korpershoek et al., 2020; UNICEF, 2025a; UNICEF, 2025b).

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Curricular review and student participation have relevant theoretical support but are more context-dependent. The curriculum should ensure structured knowledge while creating connections among fields, problems, and projects, avoiding both excessive fragmentation and academic dilution. Participation should extend to genuine decisions about relationships, spaces, projects, and priorities without transferring state responsibilities to students. Evaluations of initiatives should consider belonging, attendance, learning, and inequalities in addition to immediate satisfaction. This group draws on the fourth row of Table III, which is classified as propositional (Dayrell, 2007; Krawczyk, 2011; Brenner; Carrano, 2014; Camilo et al., 2026).

Assessment systems should combine diagnosis, feedback, and support. Outcomes need to be disaggregated and contextualised by socioeconomic status, race or colour, sex, disability, territory, and educational trajectory. Targets can guide action, but automatic sanctions based on narrow measures tend to disregard conditions and encourage superficial responses. Formative use requires comprehensible data, collective time, and assistance in planning interventions. This group corresponds to the fifth row of Table III, with moderate support contingent on policy design (Brooke, 2006; Bonamino; Sousa, 2012; Freitas, 2012).

Measures classified as moderately supported, such as multidisciplinary teams, tutoring, and mentoring, should be implemented with explicit design and evaluation. Their plausibility is high, but cost, composition, and effectiveness vary; the evidence assembled here does not support uniform expansion without testing. A small municipality may require a shared regional team, whereas a large school system may organise territorial units. Policy should define responsibilities so that referrals and bureaucracy are not added to teaching work. Pilots with pre-specified process, cost, equity, and outcome indicators should precede scaling (UNESCO; INTERNATIONAL TASK FORCE ON TEACHERS FOR EDUCATION 2030, 2024).

Integrated monitoring is a priority for both research and management. Without reducing people to numbers, a useful dashboard should combine environmental conditions, maintenance, actual workload, turnover, leave, attendance, belonging, learning, and budget execution. Its initial purpose should be support and prevention. Data protection, participation, and the opportunity to contest records are necessary to prevent punitive surveillance (Dourado; Oliveira, 2009; Alves; Xavier; Paula, 2019).

IX. LIMITATIONS AND RESEARCH AGENDA

The first limitation is the narrative, non-systematic nature of the review. Although the search strings, date, criteria, and corpus are explicit, the study did not conduct exhaustive searches across all databases, formally assess risk of bias, or perform a meta-analysis. Because no item-level record of retrieval and screening was retained, no retrospective count of included and excluded records comparable to systematic protocols is available. The corpus should be read as a verifiable analytical selection rather than the universe of scholarship. A further limitation concerns its size: 40 scientific articles support three broad fields, making uneven coverage likely, with greater density in the Brazilian literature on teaching work and less coverage of international evidence on infrastructure and the interface between digitalisation and workload.

The second limitation is procedural. A single reviewer classified the strength of support, with no second coder and no agreement estimate. The risk of classification bias is therefore only partly mitigated by the conservative rule applied in cases of uncertainty. Publishing the rubric in Table II, the mechanism-level synthesis in Table III, and the source-characterisation matrix in Appendix A makes the decisions auditable by third parties, but it does not replace double coding, which is recommended for empirical extensions of this research programme.

The third limitation arises from heterogeneity. The studies use different scales, populations, and levels of analysis. Evidence concerning the later years of compulsory schooling cannot automatically be transferred to early childhood or upper secondary education; international associations may depend on institutional design; and aggregate findings conceal territorial variation. Legal documents indicate commitments rather than implementation, while self-reported studies are subject to perception and selection effects.

The fourth limitation concerns indirect integration. Few studies measure infrastructure, work organisation, and engagement within the same design. The circuit is therefore an interpretive model, not a causal finding. The connections between intensification and support capacity and between disrupted trajectories and workload require direct testing. The matrix makes this asymmetry explicit so that theoretical coherence is not mistaken for empirical proof.

Future studies should combine administrative data and validated instruments in longitudinal and multilevel designs. A minimum agenda would include observational audits of infrastructure and its use; diaries or measures of workload and work fragmentation, including time devoted to records in information systems and digital platforms; occupational stress scales without automatic equivalence to clinical diagnosis; behavioural, emotional, and cognitive measures of engagement; belonging, support, and safety; and measures of attendance, progression, and learning. Interviews and observation are necessary to interpret mechanisms.

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Quasi-experiments could assess reforms to working time, maintenance, climate control, support teams, and retention programmes. Comparative studies across school systems should examine how funding, administrative capacity, and cooperation alter outcomes. Measures of infrastructure dispersion both across and within systems should also be developed from School Census microdata and validated scales, allowing material inequality to be described quantitatively rather than only qualitatively. Analyses should be disaggregated by territory, race or colour, gender, disability, income, and educational modality. They should also examine contradictory effects and circumstances in which schools interrupt the circuit despite constraints.

X. FINAL CONSIDERATIONS

This article examined mechanisms through which teacher work intensification, weakened student engagement, and infrastructure inequalities may interact in Brazilian basic education. The review indicates that these phenomena are neither individual failures nor independent problems. They are interconnected through time, environmental conditions, support capacity, belonging, educational trajectories, and policy design.

The principal result is a five-proposition interpretive model, formulated in Section VII and anchored in a matrix that distinguishes more consistent, moderate, and propositional support. Its contribution lies less in each individual connection, which has already been discussed, than in the requirement to examine them jointly and with different degrees of support. None is presented as a universal causal relationship.

The recent legal framework provides relevant instruments. Permanent Fundeb, the National Education System, the 2026-2036 PNE, and the National School Infrastructure Programme can bring national standards closer to territorially differentiated responses. Their potential depends on funding, intergovernmental agreement, technical assistance, participation, continuity, and monitoring. The existence of a legal rule does not eliminate the distance between policy and the school.

Priority responses combine minimum operating conditions, maintenance, accessibility, professional recognition, protected non-classroom time, occupational health prevention, early identification of barriers to retention, and the formative use of assessment. Support and innovation measures should be evaluated before being scaled. In all cases, socially referenced quality must be understood as the equitable distribution of the concrete conditions required to teach, learn, and remain in school.

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APPENDIX A - CHARACTERISATION, CATEGORISATION, AND EVIDENTIARY LIMITATIONS OF THE CORPUS

Appendix A records, for each of the 58 sources in the corpus, the type of material, the analytical category to which it was assigned, and its function in the argument, together with the corresponding evidentiary limitation. The matrix was constructed from the three-pass reading described in Section II.C and the verifiable metadata for each item. It is a partial synthesis rather than a complete record: the first pass also noted the object, population, design, and principal result in working notes, but these fields were not completed in a standardised, uniform form for every source and therefore cannot be published without introducing asymmetry. For the same reason, three fields commonly found in systematic-review matrices were deliberately omitted: sample, specific empirical context, and magnitude of results. This decision follows from the limitation stated in Section II.A; retrospective reconstruction would not faithfully represent the procedures performed. The table characterises sources rather than mechanisms: the grading of support defined in Table II applies to the proposed relationships and is summarised in Table III. Three sources form part of the methodological framework and, for that reason, are not assigned to any of the five analytical categories.

TABLE IV - Characterisation, Categorisation, and Evidentiary Limitations of the 58 Sources

Source	Type	Analytical category	Function in the argument and evidentiary limitation
Alcantara (2025)	Scientific article	Infrastructure and learning environment	Updates national measurement of school infrastructure; descriptive indicator, with no estimate of effects on learning.
Allen et al. (2018)	Scientific article	Engagement, belonging, and educational trajectory	Meta-analysis supporting the association between belonging and school outcomes; heterogeneity across included studies.

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Source	Type	Analytical category	Function in the argument and evidentiary limitation
Alves and Xavier (2018)	Scientific article	Infrastructure and learning environment	Supports multidimensional measurement in compulsory education; describes conditions rather than effects.
Alves, Xavier, and Paula (2019)	Scientific article	Infrastructure and learning environment	Provides the conceptual model of availability, adequacy, and use; conceptual contribution with no impact estimate.
Araújo, Pinho, and Masson (2019)	Scientific article	Work organisation and health	Review of research trajectories concerning teachers' work and health in Brazil; narrative synthesis with no unified prevalence estimate.
Assunção and Oliveira (2009)	Scientific article	Work organisation and health	Relates work intensification to teacher distress; context-specific association without causal inference.
Barrett et al. (2019)	Statistical, institutional, or technical document	Infrastructure and learning environment	Institutional synthesis of evidence on infrastructure and learning; heterogeneous and context-dependent studies.
Bonamino and Sousa (2012)	Scientific article	Rights and socially referenced quality	Situates generations of assessment and their curricular effects; historical-conceptual analysis without impact evaluation.
Brazil (1988)	Legal instrument	Rights and socially referenced quality	Establishes the right to education and its principles; legal validity does not demonstrate implementation.

TABLE IV (continued)

Source	Type	Analytical category	Function in the argument and evidentiary limitation
Brazil (1996)	Legal instrument	Rights and socially referenced quality	Defines guidelines, foundations, and federal responsibilities; legal validity does not demonstrate implementation.
Brazil (2008)	Legal instrument	Work organisation and health	Establishes the salary floor and the two-thirds limit on working time in direct interaction with students; legislation in force, with no compliance data.
Brazil (2020)	Legal instrument	Coordination, funding, and implementation	Regulates permanent Fundeb; legal text without a measure of resource sufficiency.
Brazil (2025)	Legal instrument	Coordination, funding, and implementation	Establishes the National Education System and intergovernmental negotiation bodies; equalising effect depends on regulation.
Brazil (2026a)	Legal instrument	Rights and socially referenced quality	Approves the 2026-2036 PNE, used in Sections 3, 4, 6, and 8; normative commitment without implementation data.
Brazil (2026b)	Legal instrument	Work organisation and health	Updates the salary-floor rule and calculation basis; legislation in force, with no compliance data.
Brenner and Carrano (2014)	Scientific article	Engagement, belonging, and educational trajectory	Examines meanings young people attribute to school attendance; context-specific qualitative study.
Brooke (2006)	Scientific article	Rights and socially referenced quality	Discusses educational accountability policies; policy analysis without effect estimates.

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Source	Type	Analytical category	Function in the argument and evidentiary limitation
Camilo et al. (2026)	Scientific article	Engagement, belonging, and educational trajectory	Discusses curricular fragmentation and loss of educational meaning; disclosed self-citation used only alongside independent literature.
Dayrell (2007)	Scientific article	Engagement, belonging, and educational trajectory	Supports the critique of treating youth as homogeneous; context-specific theoretical contribution.
Diehl and Marin (2016)	Scientific article	Work organisation and health	Systematic review of teacher mental ill-health; synthesis of heterogeneous studies.
DiPrete and Eirich (2006)	Scientific article	Rights and socially referenced quality	Provides the theoretical basis for cumulative advantage and disadvantage used in Section 7; general theory not tested in Brazilian schools.
Dourado and Oliveira (2009)	Scientific article	Rights and socially referenced quality	Supports the concept of socially referenced quality; conceptual contribution.
Farenzena and Pinto (2024)	Scientific article	Coordination, funding, and implementation	Examines the potential and limitations of Fundeb in relation to PNE targets; policy analysis.
Finn (1989)	Scientific article	Engagement, belonging, and educational trajectory	Provides the participation-identification model; predates the time frame but was admitted because it is conceptually indispensable.
Fredricks, Blumenfeld, and Paris (2004)	Scientific article	Engagement, belonging, and educational trajectory	Review defining the three dimensions of engagement; conceptual reference without national data.
Freitas (2012)	Scientific article	Rights and socially referenced quality	Discusses the effects of corporate logic on public purposes; critical essay.
Gasparini, Barreto, and Assunção (2005)	Scientific article	Work organisation and health	Relates working conditions to effects on teacher health; context-specific study.
Grant and Booth (2009)	Scientific article	Methodological framework	Supports the review typology and distinction adopted in Section 2.1; not part of the substantive analysis.
IBGE (2025)	Statistical, institutional, or technical document	Engagement, belonging, and educational trajectory	Provides estimates of upper-secondary non-completion and reported reasons; self-reported sample data that do not measure engagement.
INEP (2026a)	Statistical, institutional, or technical document	Infrastructure and learning environment	Quantifies enrolments, schools, and reported resources; administrative declarations without verification of maintenance or use.
INEP (2026b)	Statistical, institutional, or technical document	Work organisation and health	Provides national TALIS 2024 indicators on employment, working time, and satisfaction; self-reported data, not clinical measures.

Source	Type	Analytical category	Function in the argument and evidentiary limitation
Korpershoek et al. (2020)	Scientific article	Engagement, belonging, and educational trajectory	Meta-analysis of belonging and outcomes in secondary education; magnitude depends on context.
Krawczyk (2011)	Scientific article	Engagement, belonging, and educational trajectory	Situates challenges concerning the identity and meaning of upper secondary education; analytical essay.
Lima (2021)	Scientific article	Work organisation and health	Supports the hypothesis of augmented bureaucracy associated with administrative digitalisation; theoretical argument developed in Portugal, without Brazilian empirical measurement.
Mendell and Heath (2005)	Scientific article	Infrastructure and learning environment	Critical review relating pollutants and thermal conditions to performance; heterogeneous designs and measures.
OECD (2025a)	Statistical, institutional, or technical document	Work organisation and health	Provides the TALIS 2024 Brazil country note for the later years; self-reported perceptions with comparability limited by institutional design.
OECD (2025b)	Statistical, institutional, or technical document	Work organisation and health	Provides the international TALIS 2024 framework; self-reported perceptions without causal inference.
Oliveira et al. (2026)	Scientific article	Work organisation and health	Converges with the discussion of overload, psychological distress, and professional retention; disclosed self-citation with no privileged evidentiary weight.
Oliveira (2004)	Scientific article	Work organisation and health	Supports the interpretation of restructuring and precarisation of teaching work; historical-structural analysis.
WHO (2025)	Statistical, institutional, or technical document	Work organisation and health	Defines burnout as an occupational phenomenon in ICD-11; normative classification without a prevalence estimate.

TABLE IV (continued)

Source	Type	Analytical category	Function in the argument and evidentiary limitation
Pinto (2018)	Scientific article	Coordination, funding, and implementation	Supports the discussion of funding and the Quality Student Cost standard; policy analysis.
Piovezan and Dal Ri (2019)	Scientific article	Work organisation and health	Compares flexibilisation and intensification in Brazil and Portugal; qualitative comparative study.
Segatto and Abrucio (2016)	Scientific article	Coordination, funding, and implementation	Supports the analysis of cooperation in a heterogeneous federation; multi-state study.
Silva, Bolsoni-Silva, and Loureiro (2018)	Scientific article	Work organisation and health	Examines correlations between burnout and depression among teachers; correlational design without diagnostic inference.

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Source	Type	Analytical category	Function in the argument and evidentiary limitation
Snyder (2019)	Scientific article	Methodological framework	Guides the distinction among review types and their limitations; not part of the substantive analysis.
Soares et al. (2015)	Scientific article	Engagement, belonging, and educational trajectory	Identifies factors associated with dropout in public upper secondary education; state-level study without national generalisability.
Soares Neto et al. (2013)	Scientific article	Infrastructure and learning environment	Provides a scale for measuring school infrastructure; descriptive instrument.
Uline and Tschannen-Moran (2008)	Scientific article	Infrastructure and learning environment	Relates facility quality, school climate, and outcomes; institutional context differs from Brazil.
UNESCO and International Task Force on Teachers for Education 2030 (2024)	Statistical, institutional, or technical document	Work organisation and health	Frames teacher shortages and retention as policy problems; global report without a Brazil-specific estimate.
UNICEF (2025a)	Statistical, institutional, or technical document	Engagement, belonging, and educational trajectory	Records returns supported by School Active Search; programme record without an isolated causal estimate.
UNICEF (2025b)	Statistical, institutional, or technical document	Engagement, belonging, and educational trajectory	Quantifies age-grade distortion; trajectory indicator, not a measure of engagement.
UNICEF (2025c)	Statistical, institutional, or technical document	Engagement, belonging, and educational trajectory	Quantifies school disruptions associated with climate events; aggregate data without a measure of pedagogical effects.
Vasconcelos et al. (2021)	Scientific article	Infrastructure and learning environment	Discusses associations among infrastructure, public investment, and achievement; aggregate association without a causal design.
Wang and Degol (2014)	Scientific article	Engagement, belonging, and educational trajectory	Supports the dynamic and contextual nature of engagement; conceptual review.
Wang and Eccles (2012)	Scientific article	Engagement, belonging, and educational trajectory	Provides longitudinal evidence on social support and dimensions of engagement; different national context, with no demonstrated transferability.
Wargocki and Wyon (2017)	Scientific article	Infrastructure and learning environment	Relates air quality and thermal comfort to performance; heterogeneous evidence from laboratory and field studies.
Whittemore and Knafl (2005)	Scientific article	Methodological framework	Guides the integrative synthesis procedure used in the three-pass reading; not part of the substantive analysis.
Xavier, Alves, and Petrus (2024)	Scientific article	Infrastructure and learning environment	Relates quality of provision to learning inequalities in compulsory education; associational analysis.

Source: Prepared by the author.