

Algeria's educational paradox: a comparative analysis of expansion and quality in K-12 schooling

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ABSTRACT

This study investigates the enduring tension between quantitative expansion and stagnant learning outcomes in Algeria's pre-university education system from independence in 1962 to the 2024/2025 academic year. By the 2024/2025 academic year, pre-university enrollment exceeded 11.7 million students, while Algeria ranked below OECD averages in PISA 2015 with only 360 points in mathematics. Using a historical-analytical methodology, it triangulates national statistics, international benchmarks (PISA, TIMSS, UNESCO, and OECD), and recent scholarly literature to identify systemic trends across six decades. Findings show that massive growth in enrollment, teaching staff, infrastructure, and financial investment has not translated into qualitative improvement. High repetition and dropout rates persist, while Algerian students consistently underperform in international assessments. The paradox is rooted less in financial limitations than in structural weaknesses: centralized governance, fragmented teacher professional development, and unstable curricular and language policies. The originality of this study lies in linking Algeria's long-term expansion to regional comparators (Tunisia and Morocco) and international cases (e.g., Vietnam), demonstrating how governance, teacher professionalization, and language policy reforms mediate the expansion-quality relationship. The contribution is to frame Algeria's paradox within the broader Global South learning crisis, offering comparative insights for policymakers. The study concludes that sustainable progress requires a systemic shift from input-driven strategies to outcome-oriented reforms centered on distributed governance, continuous teacher training, curricular coherence, and gradual language policy implementation.

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1. INTRODUCTION

Since achieving independence in 1962, Algeria has embarked on one of the most ambitious educational expansion projects in the Global South. Education was strategically envisioned not only as a tool for national development but also as a means to promote social equity and human capital formation. By the 2024/2025 academic year, pre-university enrollment had exceeded 11.7 million students, reflecting the government's sustained commitment to universal access across all levels of schooling [1]. However, despite this remarkable quantitative growth, learning outcomes have not improved proportionally. High repetition

and dropout rates, coupled with low performance in international assessments such as Trends in International Mathematics and Science Study (TIMSS) 2015 and Programme for International Student Assessment (PISA) 2015, indicate a continuing quality crisis [2], [3]. This phenomenon—often described as the “expansion-quality dilemma”—reveals that expanding access alone is insufficient to generate meaningful learning outcomes, echoing trends observed in many developing countries [4].

The paradox can be traced to structural and institutional factors that have persisted across multiple reform waves. For instance, the Arabization and massification initiatives of the 1970s sought to promote national identity and equity but introduced enduring challenges related to linguistic duality and uneven teaching quality [5]. Later reforms, including the 2003 competency-based curriculum and more recent governance-oriented initiatives, struggled to improve classroom outcomes due to limited teacher preparation, weak institutional accountability, and inconsistent implementation across regions [6]. These historical patterns suggest that quantitative expansion has consistently outpaced qualitative consolidation.

To interpret this persistent gap, this study draws on educational systems theory and a postcolonial perspective on schooling. Systems theory conceptualizes education as an open system, where inputs, processes, and outputs are interconnected through continuous feedback loops [7]. This perspective helps explain why Algeria’s substantial investments and rising enrollment rates have not translated into stronger learning outcomes: inefficiencies in teaching practices, governance structures, and accountability mechanisms undermine the system’s effectiveness. Complementing this, a postcolonial lens highlights how inherited institutional legacies and politically driven reforms have historically prioritized access and national identity over instructional quality [8]. Together, these frameworks provide a coherent lens for analyzing the results, linking Algeria’s quantitative growth in education to the qualitative stagnation embedded within its historically shaped system.

Despite numerous studies addressing Algeria’s education system, most focus narrowly on language policy, digital integration, or specific reform programs [9]. Few offer a holistic perspective connecting macro-level policy evolution to micro-level educational outcomes over the six decades since independence. This research addresses that gap by integrating historical data, policy analysis, and international benchmarking to examine how structural, governance, and pedagogical factors collectively shape educational quality [10]. In sum, improving educational outcomes in Algeria requires more than infrastructure expansion or increased enrollment. It demands coordinated strategies that integrate governance reform, teacher professional development, curricular coherence, and localized implementation [11]. Understanding the interplay between these factors is essential for transforming enrollment gains into meaningful and equitable learning outcomes.

2. METHOD

The educational systems theory and a postcolonial perspective, providing a robust lens to examine the long-term tension between quantitative growth (inputs) and qualitative stagnation (outputs), rigorously guide this methodological choice. This approach is particularly suited for a long-term examination of Algeria’s education system (1962-2025), enabling identification of persistent structural patterns and systemic constraints that often elude short-term or localized studies [12]. The combination of these two frameworks ensures a critical and comprehensive understanding of the paradox from both systemic inefficiency and historical-political viewpoints.

The absence of primary fieldwork is deliberate, as the focus is on nationwide systemic trajectories. Priority is given to longitudinal and comparative sources, enhancing analytical depth and generalizability, consistent with best practices in educational policy research [13]. By situating Algeria’s educational trajectory within a broader institutional and comparative framework, this methodology highlights how ambitious reforms repeatedly clashed with entrenched governance inertia and institutional barriers [14].

2.1. Data sources

Data triangulation was applied across three categories (1962-2025) to ensure reliability and validity. The first is primary (national) sources: Ministry of National Education reports and legislative frameworks such as Laws 76-35 (1976) and 08-04 (2008) [15], [16]. Secondly is international sources like United Nations Educational, Scientific and Cultural Organization-Institute for Statistics (UNESCO UIS), Organisation for Economic Co-operation and Development-Programme for International Student Assessment (OECD PISA), and International Association for the Evaluation of Educational Achievement-Trends in International Mathematics and Science Study (IEA TIMSS) datasets for cross-national benchmarking [17], [18]. Lastly, the third is secondary (scholarly) sources: peer-reviewed studies on governance, teacher policy, and leadership [19]. Table 1 summarizes the data sources, temporal coverage, and analytical purposes used in this study.

Table 1. Data sources and coverage

Category	Period	Sources/examples	Purpose
Primary (national)	1962-2025	Ministry of National Education reports and Laws 76-35 & 08-04	Analyze enrollment trends, financing, and reforms
International	1970-2020	UNESCO UIS, OECD PISA, and IEA TIMSS	Provide benchmarks and cross-national comparison
Secondary (scholarly)	2018-2023	European Training Foundation (ETF), journal articles, and policy briefs	Interpret and contextualize data

2.2. Research procedure

The research unfolded in three sequential phases, summarized in the workflow in Figure 1, with the analysis explicitly guided by the theoretical frameworks. The first phase consisted of a historical review focusing on key milestones in Algeria's educational development (1962-2025), including expansion, institution building, and state investment [15]. This phase served to gather inputs and track major political shifts. The second phase consisted of a qualitative assessment based on thematic analysis of reform priorities including teacher training, curriculum renewal, and governance [20]. This phase focused on analyzing processes and evaluating their effectiveness against desired outcomes (learning, dropout, equity (urban/rural, gender), and benchmarking). The final phase consisted of governance and reform analysis, focusing on implementation gaps, governance structures, and systems leadership [21]. The educational systems theory was applied here to determine the systemic break (where inputs failed to translate into effective processes), while the postcolonial perspective framed the interpretation of central political motivations (e.g., identity vs. quality) behind the observed implementation gaps. This integrated procedure connects macro-level reforms to micro-level outcomes, providing a rigorous framework to analyze the paradox of "expansion without quality" [22].

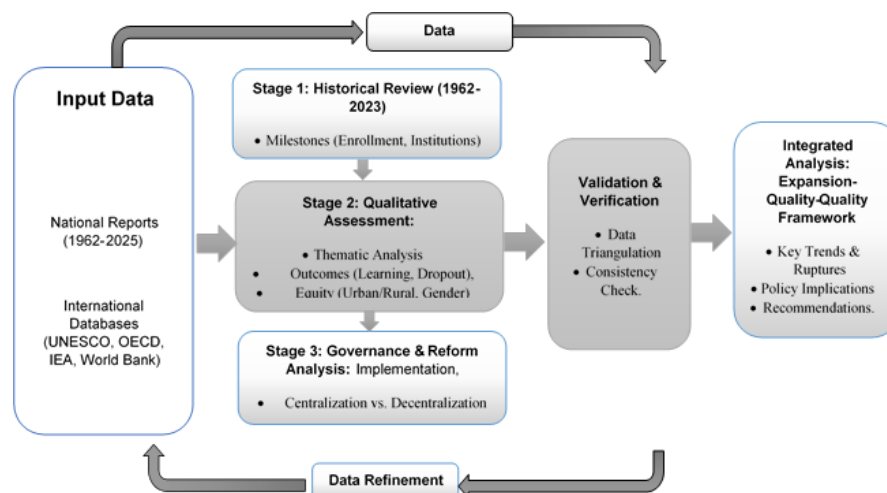


Figure 1. Expansion-quality nexus in Algeria (1962-2025)

2.3. Validity and data verification

Reliability was ensured via triangulation between national statistics and international datasets (UNESCO, OECD, IEA, and World Bank) [17], [18]. Discrepancies were cross-checked against scholarly sources, while missing data points were reconstructed using official time series. Indicators were harmonized across sources to reduce measurement bias and ensure cross-national validity [13]. Furthermore, the study enhanced policy validity by applying the theoretical frameworks to interpret documents, ensuring that the historical analysis was rigorously framed and justified, thus strengthening the trustworthiness of the policy conclusions.

3. RESULTS AND DISCUSSION

This section presents a critical analysis of Algeria's pre-university education system across four historical phases (1962-2025). The analysis utilizes the educational systems theory to explain the disconnect between sustained inputs (financing, infrastructure) and stagnant outputs (learning results). Situating Algeria

within the broader global learning crisis, [12], [23] the discussion highlights systemic barriers related to governance, teacher capacity, curriculum coherence, and socio-cultural inequities [4]. The findings underscore that the expansion-quality paradox is not an issue of resource scarcity but rather a chronic failure in the system's internal processes.

3.1. Quantitative growth versus educational quality

Table 2 highlights the substantial quantitative growth of Algeria's pre-university education system. Enrollment increased from 1.2 million students in 1962 to over 11.7 million by 2025; the number of schools approached 30,000, teaching staff exceeded 600,000, and the operational budget expanded from 323 million DZD to nearly 900 billion DZD [2], [3].

While the data presented in Table 2 demonstrate a strong political commitment to education, they also indicate an overemphasis on inputs—such as infrastructure, staffing, and budget—without corresponding improvements in learning outcomes [2], [3]. Policy success was therefore largely measured by enrollment growth and expenditure rather than by genuine student competencies or educational quality. This input-driven focus inadvertently allowed systemic process failures to persist. Comparatively, Tunisia and Morocco achieved more consistent progress by combining expansion with coherent teacher development strategies and stable curricula rather than through resource volume alone [13], [19]. Algeria's rapid massification, implemented without institutional consolidation, correlates with what the World Bank describes as schooling without learning. [19], [24] UNESCO similarly notes that Algeria exemplifies the “expansion–quality paradox” common across the Global South [1], [9]. This systemic failure is further detailed by examining the system's inefficient internal processes.

Table 2. Quantitative evolution of Algeria's pre-university education system and operational budget (1962-2025)

Indicator	1962-1963	1980-1981	2000-2001	2010-2011	2020-2021	2024-2025
Total students (all levels)	1,223,612	4,567,800	7,512,300	8,987,650	10,082,170	11,709,830
Number of primary schools	2,263	9,263	16,186	17,790	19,308	20,500
Total educational institutions	2,666	10,425	20,859	24,504	27,873	30,000
Total teaching staff	28,308	120,000	320,000	446,809	510,742	611,727
Operational budget (Million DZD)	322.7	6,723.0	137,413.8	581,612	724,681.7	900,000
Budget index (1963=100)	100	2,083	42,581	180,222	224,555	263

3.2. Student retention, dropout, and inequity

Table 3 reveals persistent inefficiencies in Algeria's education system. Repetition rates reached 6.5% at the middle school level, and secondary school dropout approached 7%, disproportionately affecting rural male students [2], [3]. Despite substantial investment in social programs—such as school transport, canteens, and allowances—dropout rates remain elevated [2], [3]. These social subsidies, while critical for access, often fail to address the core pedagogical and institutional challenges driving student attrition. This critical disconnect suggests that the issue is less about resource quantity (inputs) and more about weak governance and insufficient targeting (processes) [5]. Support is distributed broadly rather than focusing on the most vulnerable, limiting its impact. This generalized approach significantly limits the potential for maximizing educational returns in marginalized communities. By contrast, Tunisia reduced rural dropout through targeted subsidies, and Morocco linked social assistance directly to school performance [18], [19]. The differences between Algeria and these countries appear primarily linked to policy coherence and teacher support strategies rather than cultural or economic factors [16], [19]. This underscores that effective policy design and implementation are more predictive of success than initial resource allocation. Without decentralized accountability, social measures risk being politically symbolic rather than pedagogically effective, contributing to systemic process failures [3].

Table 3. Repetition and dropout rates in pre-university education by stage and gender (2020-2021)

Indicator	Educational stage	Repetition rate	Dropout rate	Male proportion of dropouts/repeaters (2021)
Primary education	Primary	0.8%	0.3%	N/A
Middle education	Middle	6.55%	2.15%	~65% Repeaters/~62% dropouts

3.3. International benchmarking and the quality gap

Having traced Algeria's historical trajectory, it is instructive to situate these trends within a broader international context. Table 4 highlights the severity of Algeria's learning deficit: in PISA 2015, students

scored 360 in mathematics and 376 in science, compared to OECD averages of around 490. TIMSS 2015 results similarly placed Algeria over 100 points below international benchmarks [25], [26].

This performance gap reflects chronic deficiencies within the system's internal processes, rather than simple resource scarcity. Despite sustained financial investment, learning effectiveness is constrained by inadequate teacher professionalization, persistent curriculum instability, and weak school-level instructional guidance [2], [3], [24]. Internationally, this pattern—where schooling does not translate into learning outcomes—places Algeria within the scope of global learning poverty [19]. Differences comparative evidence from Tunisia and Morocco suggests that the divergence in outcomes is largely due to differences in policy coherence and robust teacher development frameworks, rather than inherent cultural or economic distinctions [25], [26]. The experience of countries like Vietnam underscores the pivotal role of effective governance and high instructional quality in mediating expansion [5], [17]. Furthermore, the current implementation of technology policies in Algeria risks exacerbating existing educational inequalities [14], [27].

Table 4. Performance of Algerian students in PISA 2015 and TIMSS 2015 compared to international averages

Assessment	Subject	Educational level/age	Algeria score	International average	Notes
PISA 2015	Reading	15 years old	387 points	493 points (OECD avg)	Below OECD & Middle East and North Africa (MENA) average (~410 points)
PISA 2015	Mathematics	15 years old	360 points	490 points (OECD avg)	~66/70 countries
PISA 2015	Science	15 years old	376 points	493 points (OECD avg)	Weak knowledge application
TIMSS 2015	Mathematics	Grade 8	358 points	500 points	Deficits in science, technology, engineering, and mathematics (STEM)
TIMSS 2015	Science	Grade 8	354 points	500 points	Reflects systemic weaknesses

3.4. Reform effectiveness and teacher training

To understand Algeria's educational trajectory over the past two decades, it is helpful to examine national examination success rates as key indicators of policy and pedagogical effectiveness. Table 5 shows results from 2003 to 2025 [2], [5]. Pass rates in the baccalaureate fluctuated between 48% and 67%, reflecting inconsistent implementation of reforms (process failure). Ambitious initiatives, including the 2003 curriculum revision and the 2008 Orientation Law, were introduced but not consistently supported.

Limited teacher training and insufficient monitoring meant that many reforms remained symbolic rather than transformative [6], [11]. In contrast, Tunisia and Morocco linked curricular reforms to ongoing teacher development, achieving more stable outcomes [16], [5]. Studies indicate that Algerian school principals have a limited role in supporting teacher learning, further reducing reform effectiveness [6], [23]. The World Bank emphasizes that coherent teacher policy frameworks are crucial for sustainable reform [11], and research on distributed leadership highlights the importance of empowering school leaders to guide professional development [21]. Algeria's reliance on top-down directives, without strong teacher policy frameworks, has constrained the impact of reforms [8], [9].

Table 5. Evolution of success rates in national exams (2003-2025)

Year	Baccalaureate (%)	Brevet d'Enseignement Moyen (BEM) (%)	Primary completion (%)
2003	55.74	41.52	59.40
2004	48.76	45.38	50.40
2005	47.96	47.19	79.40
2019	54.51	58.74	93.22
2021	61.17	64.46	83.95
2023	50.63	60.97	83.43

3.5. Governance, language policy, and school leadership

Algeria's education system faces a governance trap. Centralized reforms often begin with strong political support but fail to produce lasting classroom change. This excessive centralization, an inheritance often rooted in postcolonial state-building necessities, results in weak accountability and limited school autonomy, reducing schools to passive implementers [14], [28]. Even well-funded initiatives, such as curriculum reforms and teacher recruitment, have not consistently improved learning outcomes [2], [29].

Language policy shifts are correlated with challenges in teacher preparation and curriculum instability [15], [22], [20], [30]. Sudden transitions between Arabization, partial bilingualism, and the recent push for English in STEM have increased burdens on teachers and students rather than supporting learning. In contrast, Tunisia and Morocco implemented gradual bilingual strategies combined with continuous teacher training, showing that incremental reforms enhance stability and outcomes [18], [19].

School leadership in Algeria remains underdeveloped. Principals primarily manage administrative tasks with limited authority to adapt teaching, allocate resources, or foster innovation [31], [32]. The absence of distributed leadership constrains reform, particularly in rural and marginalized areas. Comparative evidence shows that countries with empowered school leaders, such as Finland and some East Asian systems, achieve stronger learning outcomes [20], [31], [32]. Algeria's limited leadership training and narrow decision-making powers remain a bottleneck in addressing the expansion-quality gap [10], [17]. Research on transformational leadership underscores that effective leadership drives cultural and pedagogical change, a component largely missing in Algerian schools [12]. The interdependence of governance, language policy, and school leadership can be conceptualized as an integrated structural framework shaping the effectiveness of educational reform in Algeria, as illustrated in Figure 2.

The interaction of governance, language policy, and school leadership forms a structural triangle that decisively shapes reform effectiveness. Weakness in any vertex—whether excessive centralization, unstable language policy, or underdeveloped leadership—reduces the system's overall adaptive capacity. In Algeria, the simultaneous fragility of all three dimensions magnifies the challenge, particularly in rural schools where reforms intersect with entrenched socio-economic inequities. This triangular constraint helps explain why policies that appear promising on paper often yield limited or uneven outcomes in practice, reinforcing the cycle of schooling without learning [28], [29].

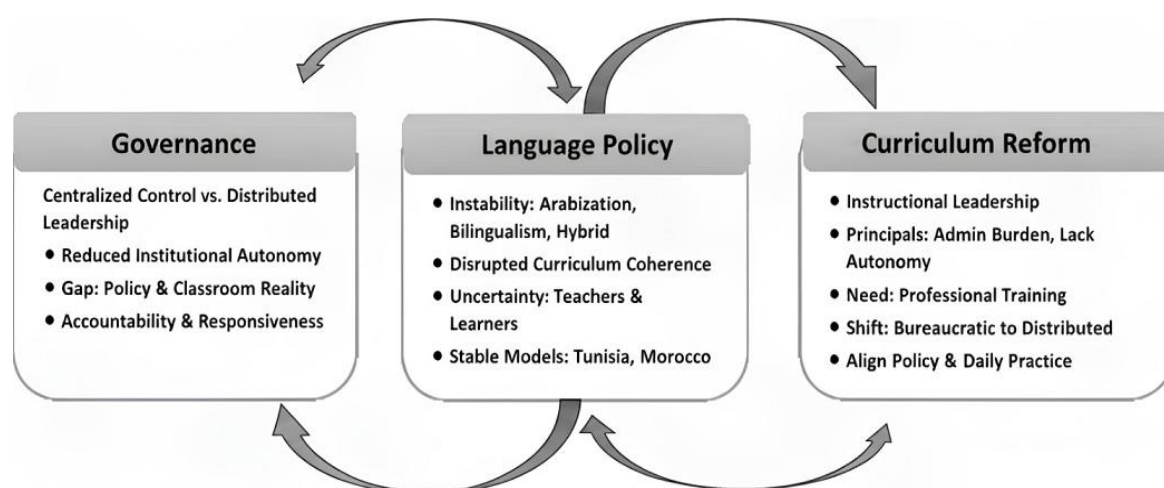


Figure 2. The governance-language-leadership triangle shaping Algeria's education system

3.6. Periodization and global perspective

Algeria's educational trajectory reflects four distinct historical phases that embody the global expansionquality puzzle:

3.6.1. 1962-1979: state-building and expansion (high inputs and weak processes)

Rapid enrollment growth dramatically extended access to education (inputs), but teacher preparation and pedagogical support lagged far behind (processes), producing what has been termed schooling without learning [1], [2].

3.6.2. 1980-1999: crisis management (input strain and amplified output gaps)

Economic austerity, demographic pressures, and inequitable resource distribution amplified learning gaps (outputs), disproportionately affecting rural and marginalized populations [4], [5].

3.6.3. 2000-2013: reform era (ambitious declarations and fragmented processes)

Ambitious initiatives—including curriculum renewal, information and communication technology (ICT) integration, and targeted teacher training—were constrained by fragmented implementation,

inconsistent language policies, and weak school leadership (processes) [6], [5]. Reforms were often politically visible but pedagogically shallow.

3.6.4. 2014-2025: digitalization and linguistic reorientation (misaligned inputs and processes)

ICT investments (inputs) modernized pedagogy in urban centers, but infrastructural gaps and uneven digital literacy limited their nationwide impact. The abrupt rollout of English in STEM subjects highlighted the disconnect between policy ambition and classroom capacity, repeating earlier cycles of instability [13], [14].

Comparing outcomes with neighboring countries and global benchmarks further clarifies how structural features within Algeria's education system—such as centralized governance and uneven teacher preparation—have constrained learning improvement [16], [18]. Curriculum instability has also hindered reform continuity, limiting the long-term impact of policy initiatives [19]. These systemic characteristics help explain why reforms that appeared promising at the policy level often produced limited classroom impact, a pattern consistent with other postcolonial education systems where governance and instructional quality remain misaligned [5], [17].

Across these phases, the underlying pattern is clear; Algeria's challenges stem less from a lack of resources or reform initiatives and more from chronic deficits in strategic coherence, institutional consolidation, and governance capacity (processes). Policies were repeatedly declared yet inconsistently implemented, sustaining the dilemma of quantitative expansion without qualitative improvement [2], [7], [9]. Social programs remain extensive but insufficiently targeted, reforms ambitious yet declarative, and international benchmarking exposes a chronic learning deficit that repeated expansion has failed to resolve [8], [27], [26]. Despite investments in ICT, Algeria has yet to harness smart learning environments effectively, a gap noted in comparative research [8], [29]. Addressing this challenge requires a systemic shift from input-driven strategies toward outcome-oriented reforms that integrate governance accountability, professional capacity-building, and empowered school leadership. As Fullan has argued, genuine educational change demands not only structural reform but also deep cultural and professional transformation—a lesson Algeria's fragmented reforms have yet to internalize [29].

4. CONCLUSION

This study confirms that Algeria's educational paradox—rapid quantitative expansion failing to yield sustained learning outcomes—is rooted in systemic failure. Despite massive growth in inputs (schools, staff, and enrollment), structural weaknesses, including excessive centralized governance, limited school-level leadership, and fragmented teacher professional development, have prevented these resources from effectively translating into qualitative outputs. These imbalances, which contribute to chronic performance gaps, particularly in rural and disadvantaged areas, underscore the critical disconnect between political ambition and institutional capacity. The findings demonstrate that the problem is one of ineffective processes rather than resource scarcity.

Analysis of successive reforms reveals that fragmented implementation, limited local autonomy, and continuous policy instability—particularly concerning language instruction and curricular priorities—have constrained effectiveness. This research offers an original contribution by linking the quantitative-qualitative paradox to fundamental deficits in the system's internal processes, viewing these constraints through a structural and critical lens.

Notably, the analysis indicates that governance reforms exert a measurable impact on learning outcomes, as reflected in international assessments such as PISA and TIMSS, where systems with coherent governance structures tend to achieve higher and more stable scores. Comparative experiences from neighboring countries like Tunisia and Morocco highlight that quality improvements are possible when expansion is coupled with curricular stability and strong local governance. Furthermore, selective global evidence from cases like Vietnam demonstrates that efficiency and equity are achieved when reforms are strategically aligned with systemic capacity, emphasizing the importance of addressing the socio-cultural dimension of educational inequality, especially the rural–urban and gender divides.

Based on these findings, future strategy must pivot from input-driven approaches towards systemic, process-oriented transformations. We recommend three actionable pathways: first, implement distributed governance by empowering school councils with greater autonomy over instructional and budgetary decisions. Second, establish continuous teacher professional development supported by clear evaluation and accountability mechanisms linked to student performance. Third, institutionalize a gradual and coherent language policy that avoids the abrupt, disruptive shifts that destabilize the classroom environment. While international benchmarks (PISA and TIMSS) offer useful comparative insights for policy direction, their applicability must be critically examined to prevent the uncritical adoption of external agendas. In sum, Algeria's enduring educational transformation hinges not merely on sustaining access, but on resolving the

institutional and cultural barriers within the system to convert its impressive quantitative growth into meaningful, equitable, and sustainable learning outcomes.

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C : **C**onceptualization

M : **M**ethodology

So : **S**oftware

Va : **V**alidation

Fo : **F**ormal analysis

I : **I**nvestigation

R : **R**esources

D : **D**ata Curation

O : Writing - **O**riginal Draft

E : Writing - Review & **E**ding

Vi : **V**isualization

Su : **S**upervision

P : **P**roject administration

Fu : **F**unding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

Not applicable. This study did not involve human participants; it relied exclusively on secondary and publicly available data sources.

ETHICAL APPROVAL

This research did not involve experiments on humans or animals. All data were obtained from secondary and publicly available sources, such as official reports, international assessments, and peer-reviewed academic publications. The study adhered to established academic standards, including compliance with institutional policies, national regulations, and academic integrity. The authors acknowledge that several paragraphs in the manuscript have been revised to enhance clarity and linguistic precision in accordance with reviewer feedback. Language enhancement tools were used solely to support clarity, with full adherence to the scientific integrity and methodology of the research. No generative AI tools (e.g., ChatGPT, Gemini, and Claude) were used in drafting the manuscript. All writing, analysis, and revisions are the sole responsibility of the authors.

DATA AVAILABILITY

The data supporting the findings of this study were obtained from secondary and publicly available sources, including official reports of the Algerian Ministry of National Education, international assessments (PISA and TIMSS), and publications by organizations such as UNESCO, OECD, and the European Training Foundation. All these sources are properly cited in the reference list. No new data were created or analyzed in

this study. Additional information can be made available upon reasonable request from the corresponding author, [OZ].

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