

Implementation of an intelligence model in educational management: case study in a small-scale municipality

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Abstract—This study analyses the implementation of an Educational Management Intelligence (IGED) model in a small-scale municipality in Minas Gerais, focusing on the strengthening of state capacity. Through a qualitative case study, this paper examines the application of an approach based on the systematic use of data, the organization of continuous management cycles, and the integration of administrative and pedagogical dimensions. The results indicate progress in the institutionalization of monitoring procedures, the improvement of educational planning, and coordination between the municipal department and schools. Although there is no conclusive evidence of an impact on learning, the main effect observed is the building of state capacity, which is essential for the sustainable improvement of educational outcomes. The study highlights the approach's potential for replication.

Keywords—Educational management; State capacity; Public policies; Small-scale municipality.

I. INTRODUCTION

Basic education policies are implemented primarily at the municipal level, alongside issues such as health and social services. This characteristic arises from the division of responsibilities and powers among the different levels of government established by the federal system on which the Brazilian state is based. In the educational context, the three levels of government play key roles in implementing policies in a collaborative manner [1][2].

In a country with more than 5,000 municipalities, most of which are small, various factors influence the balance of Brazil's decentralization process, with the aim of organizing an educational system that fully realizes the population's right to education. It is possible to identify different levels of involvement by municipal departments of education in educational policies, depending on their administrative, structural, and financial differences [3].

In order to align this balance with the varying capacities of local governments observed in Brazil, the federal government provides technical and financial assistance to municipalities for the implementation of educational policies [4]. However, by shedding light on the varying results of the Ideb, Brazil's official indicator of student learning, Abrucio [5] argues that budgetary adjustments should not be considered the sole factor affecting the educational process.

Within this context, the concept of state capacity is defined as "the ability to identify problems, formulate solutions, implement actions, and deliver results" [6]. Based

on this concept, the discussion focuses on how competencies and skills are mobilized to set objectives and achieve them.

A major challenge faced by municipalities with limited government capacity lies precisely in their technical ability to collect, analyze, and utilize data for public policy, as well as in the discontinuity of policies with each election cycle. Consequently, one identified gap is the lack of a model for the continuous use of data generated from network assessments and evaluations to ensure efficient management.

This study, therefore, aims to present and analyze the implementation of a structured intelligence model in educational management, based on a case study in a small municipality in Minas Gerais. By examining the unique characteristics of a small municipality in Minas Gerais, the study also contributes to the discussion regarding state capacities that shape the implementation of educational policies [6], a fundamental aspect for understanding the limits and possibilities of decentralization in Brazilian federalism [3].

II. THE EDUCATIONAL MANAGEMENT INTELLIGENCE (IGED) MODEL

The Educational Management Intelligence (IGED) model constitutes a structured approach to supporting public education management, guided by the systematic use of data, the organization of decision-making processes, and the integration of administrative management with pedagogical practices. Its primary objective is to strengthen the institutional capacity of municipal departments of education to plan, implement, and monitor evidence-based educational policies.

The model's design is based on the recognition that, in small municipalities, the availability of educational data does not necessarily translate into its strategic use. In this context, IGED proposes transforming data into meaningful insights and structured decisions, thereby promoting greater coherence between diagnosis, planning, and action. Furthermore, the proposal aligns with the principles of the United Nations Sustainable Development Goals (SDGs), particularly SDG 4 - Quality Education. This goal advocates for ensuring inclusive, equitable, and quality education, as well as promoting lifelong learning opportunities for all.

By establishing evidence-based management processes and strengthening educational planning capacity, this approach directly contributes to the advancement of goals

related to learning, equity, and the improvement of educational systems. The model is grounded in principles that can be described as (1) evidence-based management, (2) continuous cycles of improvement, (3) integration between administrative and pedagogical areas, and (4) professional development as a central pillar. Thus, educational decisions are guided by performance, flow, and context indicators, including assessments, academic performance data, and information about the school system.

This model relies on the organization, technical analysis, and ongoing use of this data as the basis for educational planning. The process is organized into cycles involving diagnosis, planning, implementation, and monitoring, allowing for ongoing adjustments to the strategies adopted. This cyclical approach enables educational management to evolve progressively and respond to identified needs. This cycle is not self-contained but feeds back into itself, allowing for constant review of strategies and the consolidation of an evidence-based planning culture.

By integrating administrative and pedagogical dimensions, the framework aims to overcome the disconnect between the department's management and the work carried out in schools. Strategic decisions are linked to pedagogical practices, particularly through the connection between learning assessments and professional development initiatives. The professional development of educators is understood as a central element for improving educational outcomes, ensuring greater alignment with the actual needs of the school system.

IGED uses a set of tools that facilitate its implementation and monitoring, such as performance-based monitoring mechanisms organized into categories that allow for the classification of the development stage of initiatives and guide more precise interventions. In addition, the methodology incorporates diagnostic assessments as a central tool for understanding students' learning levels, informing instructional planning and the definition of teacher development strategies.

Another key element is the implementation of systematic mentoring sessions with the management team of the Department of Education, creating an ongoing environment for analysis, decision-making, and monitoring of initiatives. This process contributes to strengthening educational leadership and institutionalizing management routines. Finally, the model provides for the development of medium and long-term strategic plans, aligned with official indicators, as a way to guide the municipality's educational policy and ensure greater sustainability for the actions implemented.

III. METHODOLOGY

This study is characterized as a qualitative, case-study-type research, as it allows for an in-depth investigation of contemporary phenomena within their real-world context [7]. This strategy is well-suited to the analysis of complex educational management processes, in which multiple variables interact dynamically, emphasizing a contextualized and interpretive understanding of the phenomena under analysis.

The methodology for implementing the concept of Intelligence in Educational Management in a practical case

study was structured in 6-month cycles, totaling one year of concrete experience in application within a small-scale municipality in Minas Gerais. Thus, the research is based on multiple sources of evidence, such as technical reports, monitoring records, and educational data, based on weekly monitoring strategies, ongoing training with the municipality's technical and pedagogical staff, and the systematic use of data for a comprehensive analysis of the school system.

IV. IMPLEMENTATION OF THE MODEL

The pilot project to implement the Educational Management Intelligence (IGED) methodology took place in a small municipality in eastern Minas Gerais, with approximately 20,000 residents and about 3,000 students enrolled in the municipal school system. This context exhibits characteristics typical of smaller-scale educational systems, such as a limited administrative structure, a shortage of specialized technical staff, and a strong reliance on the direct involvement of the Municipal Department of Education in the conduct of educational policies.

In this scenario, the implementation of the approach did not take the form of introducing an external system, but rather a process of reorganizing and improving existing practices, with a focus on institutionalizing evidence-based management routines. The starting point was the conduct of a structured educational assessment, which identified weaknesses related to the lack of systematic monitoring of indicators, the fragmentation of planning processes, and the limited coordination between administrative management and pedagogical practices.

Based on this assessment, the implementation of the approach began through continuous monitoring cycles, organized on a semiannual basis and supported by weekly mentoring sessions with the management team of the Department of Education. These meetings provided a strategic setting for data analysis, priority setting, monitoring of actions, and decision-making, contributing to the strengthening of educational management and leadership capacity.

In the scope of strategic management, routines for monitoring educational indicators were established, involving the organization and systematization of previously scattered data. The introduction of performance-level monitoring mechanisms provided greater clarity in identifying priorities and directing actions, promoting a more results-oriented management approach. At the same time, progress was made in strengthening pedagogical management, with support provided to school teams in developing evidence-based action plans. This initiative helped align the Secretariat's decisions with practices implemented in schools, bridging the gap between planning and execution.

Professional development was a central pillar of the implementation and was structured based on the needs identified in the assessment. The training initiatives covered strategic topics such as literacy, numeracy, social-emotional development, and educational management, with the aim of enhancing teaching practices and ensuring alignment between teaching and learning.

In addition, the implementation involved developing a more structured educational plan, including the setting of goals, the creation of timelines, and alignment with the guidelines of the Municipal Education Plan and external evaluation indicators. This process allowed for greater predictability in actions and strengthened consistency among the various planning tools.

Overall, the implementation of this approach was characterized by a gradual process of transforming management practices, with an emphasis on organizing routines, the effective use of data, and integration across different levels of educational policy. Rather than merely carrying out isolated actions, the process sought to establish a new operational framework for the Department of Education, guided by continuity, the systematization of information, and evidence-based decision-making.

V. RESULTS AND EVIDENCE

An analysis of the results obtained from the implementation of the Educational Management Intelligence approach reveals significant progress, particularly in strengthening the institutional capacity of the Municipal Department of Education. Given the early stage of the implementation cycle and the lack, to date, of consolidated student performance data for the year 2025, these results are presented in terms of institutional, operational, and pedagogical outcomes, which serve as relevant indicators of transformation in educational management.

Transversally, the progress observed aligns with the principles of the SDGs, particularly SDG 4, by promoting the strengthening of more equitable, effective, and evidence-based education systems, as well as by contributing to the improvement of the institutional conditions necessary for learning.

A. Institutional Results

The main advances observed are concentrated at the institutional level, particularly with regard to the incorporation of evidence-based management practices. There has been a consolidation of routines for organizing, analyzing, and utilizing educational data, which was previously scattered or underutilized, contributing to greater diagnostic clarity and a stronger foundation for strategic decisions.

This process has led to an expansion of the technical capacity of the Department of Education's staff, the structuring of the decision-making process, and the establishment of a culture of continuous monitoring. This change represents a significant step forward in integrating indicator monitoring into institutional routines, as it shifts the focus from managing one-off actions to continuous processes of monitoring, evaluation, and adjustment.

These results contribute directly to the strengthening of local educational governance, an essential element for achieving the goals of SDG 4, especially with regard to improving the quality of education and reducing inequalities (SDG 10) through better-structured and monitored policies.

B. Operational Results

At the operational level, notable progress has been made in the organization of management processes. This implementation has enabled the development of more consistent planning tools, including the establishment of goals, timelines, and responsibilities, thereby promoting greater predictability in the actions undertaken.

Tracking through indicators has been incorporated as a regular practice, allowing for the monitoring of actions and the identification of deviations from the plan. This initiative has contributed to improved efficiency in the implementation of educational policies and to greater transparency in management processes.

Another important aspect concerns the strengthening of coordination between the Department of Education and individual schools. There is greater integration across educational levels, with more consistent alignment between central administration guidelines and the practices implemented in schools. This closer coordination facilitates more effective implementation of initiatives and fosters a more cohesive approach within the municipal school system. In addition, the municipal phase of the State Education Conference was held, which enabled the mobilization of various segments of the school community and the election of a representative to participate in the state-level phase. At the same time, the Municipal Education Conference was held, a key forum for social participation and monitoring of educational policies. These processes contributed to strengthening democratic governance, expanding institutional dialogue, and improving educational planning, particularly with regard to the consolidation and enhancement of the Municipal Education Plan.

From SDG perspective, these initiatives go beyond SDG 4 by promoting more inclusive and participatory educational governance, but they also align with SDG 16, which focuses on building effective, accountable, and transparent institutions. The institutionalization of spaces for participation and collective planning strengthens the municipality's capacity to develop more legitimate and sustainable educational policies.

C. Preliminary Educational Results

In the pedagogical field, although it is not yet possible to present consolidated learning outcomes through the Ideb, significant progress has been observed in the organization of pedagogical work and in the improvement of teaching practices. Professional development, structured based on the assessments conducted, has contributed to a better alignment between the needs of the school system and the training content offered.

This alignment has led to a more precise targeting of educational initiatives, focusing on strategic areas such as literacy and reading skills, as well as on the development of essential competencies to improve student performance. In addition, there is a greater sense of intentionality in teaching practices, resulting from the use of data to inform classroom planning and interventions.

The organization of pedagogical work has also been impacted, with greater clarity in the definition of objectives, strategies, and methods for monitoring learning, which tends

to contribute, in the medium term, to the improvement of educational indicators.

These advances are directly aligned with the objectives of SDG 4 regarding ensuring effective learning, improving the quality of education, and valuing education professionals, highlighting the importance of policies that integrate teacher training, educational management, and the use of evidence. Furthermore, through SDG 4, schools in the municipality are also integrating pedagogical practices with all other SDGs, turning students starting in basic education into global citizens.

D. Limitations and prospects

Despite the progress observed, it is important to acknowledge the limitations of this study. The main limitation relates to the lack, to date, of consolidated student performance data for the year 2025, which hinders the analysis of the direct impact of the approach on learning indicators.

In this regard, the results presented focus on institutional and organizational transformation processes, which, although fundamental, constitute intermediate stages in the journey toward improving the quality of education. The consolidation of the approach's effects on student performance will depend on the continuity of the implemented actions and the longitudinal monitoring of educational indicators.

In terms of future prospects, it is important to conduct more in-depth analyses based on the results of diagnostic and external evaluations, in order to assess the relationship between the institutional changes implemented and the progress of student learning. Such an assessment will enable a more consistent evaluation of the approach's contribution to achieving the goals established under SDG 4.

VI. DISCUSSION

The results observed following the implementation of the Educational Management Intelligence approach provide insights into effective strategies for strengthening educational management in small-scale municipalities. Unlike isolated interventions or those focused exclusively on short-term learning outcomes, the proposal analyzed highlights the importance of an organized, continuous, and evidence-based structure as a prerequisite for the sustainable improvement of educational systems.

Among the approach's key strengths is its replicable structure, based on clear cycles of diagnosis, planning, implementation, and monitoring, which allows it to be adapted to different municipal contexts. This feature is particularly relevant in settings with low institutional capacity, where the absence of systematized processes undermines the continuity of public policies. By providing an organized management framework, the approach helps reduce reliance on isolated actions and strengthens the institutional framework of education policy.

Another key aspect concerns the integration of administration and pedagogy, which are often treated as separate entities in public school systems. The coordination of data analysis, strategic planning, and pedagogical practices fosters greater consistency between decisions made by central administration and the work carried out in schools,

thereby increasing the potential impact of the initiatives implemented.

Furthermore, the emphasis on the systematic use of data as a management tool is a key component of the approach. By transforming data into inputs for decision-making, the proposal contributes to the development of an evidence-based institutional culture, a fundamental condition for improving educational policies and achieving greater equity and quality, in consonance with the guidelines of SDG 4.

In this context, one of the study's key findings is that the most significant results, in the early stages of implementation, are not immediately reflected in traditional educational indicators, but rather in the development of institutional capacity. The consolidation of management routines, the technical strengthening of teams, and the institutionalization of monitoring processes constitute foundational outcomes that create the necessary conditions for future advances in student learning. As a contribution, the study highlights that the approach analyzed has the potential for application in other small-scale municipalities, especially those facing challenges related to the organization of educational management and the strategic use of data.

VII. FINAL CONSIDERATIONS

This study sought to present and analyze the implementation of a structured approach to Educational Management Intelligence in a small-scale municipality, highlighting its potential as a strategy for strengthening public educational management. The results indicate that the consolidation of evidence-based processes is a key element for the sustainable improvement of educational systems.

The case study shows that the main progress made in the initial stage lies in institutional capacity-building, as evidenced by the establishment of management routines, the effective use of data, and the integration of administrative and pedagogical aspects. These elements constitute essential conditions for improving learning outcomes, although their most direct effects depend on monitoring over the medium and long term.

Furthermore, the approach demonstrates potential for replication in similar contexts, particularly in municipalities facing technical and structural constraints. By integrating planning, monitoring, and continuing professional development into a single management framework, it contributes to the advancement of more consistent educational policies aligned with the quality and equity guidelines advocated as part of SDG 4.

Finally, it is important to emphasize the need for continuity and further development of the implemented actions, as well as the incorporation of future analyses that allow for measuring their impacts on student learning. In this sense, the study contributes to reflection on educational management practices, as well as to the debate on innovation and the strengthening of state capacity in public education.

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