COMPOSITION OF MANAGEMENT TEAMS AND LEADERSHIP PRACTICES: EVIDENCE FOR A RESEARCH AGENDA

COMPOSIÇÃO DAS EQUIPES GESTORAS E PRÁTICAS DE LIDERANÇA: EVIDÊNCIAS PARA UMA AGENDA DE PESQUISA

COMPOSICIÓN DE EQUIPOS DIRECTIVOS Y PRÁCTICAS DE LIDERAZGO: EVIDENCIA PARA UNA AGENDA DE INVESTIGACIÓN

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ABSTRACT: The research aims to identify whether the composition of school teams acts as an advantage or constraint to the leadership practices adopted by managers. The study analyzes information about 138 schools in Espírito Santo and Piauí, derived from the Management Practices, Educational Leadership, and Quality of Education Survey (Oliveira et al., 2023). Data on leadership practices were analyzed, seeking to identify possible correlations between these and the availability of professionals at the school level. The results indicate that there are significant differences when comparing the states covered by the research, requiring a qualitative analysis of state policies. Furthermore, it is noted that the presence of more pedagogical professionals at the school does not guarantee good leadership practices, specifically those related to pedagogical support, direction, collaboration, and observation in the classroom, something that may result from the absence of a team policy multidisciplinary teams in schools, with a structured workflow.

KEYWORDS: School leadership. School teams. Contextual factors. State capacity. Path analysis.

RESUMO: *A pesquisa tem como objetivo identificar se a composição das equipes escolares atua como vantagem ou constrangimento às práticas de liderança adotadas pelos diretores. O estudo analisa informações sobre 138 escolas do Espírito Santo e Piauí, oriundas da Pesquisa Práticas de Gestão, Liderança Educativa e Qualidade da Educação (Oliveira et al., 2023). Os dados sobre as práticas de liderança foram analisados buscando identificar possíveis correlações entre estas e a disponibilidade de profissionais no âmbito escolar. Os resultados apontam que há diferenças significativas quando comparados os estados abrangidos pela pesquisa, sendo necessária uma análise qualitativa sobre as políticas estaduais. Além disso, nota-se que a presença de mais profissionais pedagógicos na escola não garante boas práticas de liderança, especificamente as relacionadas ao apoio pedagógico, direção, colaboração e observação em sala de aula, algo que pode decorrer da ausência de uma política de equipes multiprofissionais nas escolas, com um fluxo estruturado de trabalho.*

PALAVRAS-CHAVE: *Liderança escolar. Equipes escolares. Fatores contextuais. Capacidades estatais. Análise de caminho (path analysis).*

RESUMEN: *La investigación tiene como objetivo identificar si la composición de los equipos escolares actúa como una ventaja o una limitación para las prácticas de liderazgo adoptadas por los directivos. El estudio analiza información sobre 138 escuelas de Espírito Santo y Piauí, derivada de la Encuesta de Prácticas de Gestión, Liderazgo Educativo y Calidad de la Educación (Oliveira et al., 2023). Se analizaron datos sobre prácticas de liderazgo buscando identificar posibles correlaciones entre éstas y la disponibilidad de profesionales a nivel escolar. Los resultados indican que existen diferencias significativas al comparar los estados cubiertos por la investigación, requiriendo un análisis cualitativo de las políticas estatales. Además, se advierte que la presencia de más profesionales pedagógicos en la escuela no garantiza buenas prácticas de liderazgo, específicamente aquellas relacionadas con el apoyo pedagógico, dirección, colaboración y observación en el aula, algo que puede resultar de la ausencia de una política de equipo multidisciplinario. equipos en las escuelas, con un flujo de trabajo estructurado.*

PALABRAS CLAVE: *Liderazgo escolar. Equipos escolares. Factores contextuales. Capacidades estatales. Análisis del camino (path analysis)*

Introduction

There is a relative consensus in both public and academic discourse that educational policies implemented in recent decades have expanded access to primary education[5]. However, there is also a relative acceptance that this expansion has not necessarily been accompanied by the assurance of student learning with quality and equity (Oliveira; Araujo, 2005; Sposito; Souza, 2014).

Numerous studies have sought to identify which educational policies contribute to improving indicators of retention, flow, and learning (Glewwe; Muralidharan, 2016). he objective has been to highlight factors deserving attention from public policymakers and, complementarily, to ascertain if these factors are cross-cutting and applicable in different contexts.

A prime example is the quality of governance, which plays a decisive role in achieving good academic outcomes in decentralized educational systems (Glewwe; Muralidharan, 2016). The concept of governance encompasses aspects associated with effective management, including goal setting, actions aimed at education professionals (recruitment, training, retention, and career progression), and practices of accountability and monitoring. Other aspects contribute to the framework, such as the efficient allocation of resources, regulatory structure, and the relationship between actors and decision-making bodies.

Governance standards are often analyzed based on how educational policies are formulated and implemented. In schools, attention is paid to decision-making processes within socio-educational activities, as well as the allocation of material and human resources. At this level of analysis, the figure of the school principal becomes prominent. Principals are the professionals responsible for coordinating educational work, including commitments to pedagogical, administrative, and relational practices (Luck, 2009; Miller, 2013; Naidoo, 2019).

It is expected that school management be capable of enhancing efficiency in the allocation of public resources (Barros *et al.*, 2021), given that school leadership, particularly of an instructional nature, generates positive effects on learning and minimizes the influence of social background on educational outcomes (Leithwood, 2009; Day *et al.*, 2009, 2010; Grissom; Loeb, 2011; Oecd, 2013; Costa; Figueiredo, 2013; Oliveira; Carvalho, 2018; Valdés,

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[5] In accordance with what is established by the Education Guidelines and Bases Law (Law 9,394 of December 20, 1996), basic education is mandatory and free from 4 to 17 years of age, being organized into preschool, elementary school, and secondary education average.

2023). Not surprisingly, management represents one of the most critical factors for achieving school outcomes (Weinstein *et al*, 2019).

There is no single definition of leadership. In a synthesis effort, Leithwood *et al.* (2006) assert that leadership promotes organizational improvement through decision-making that is widely agreed upon and legitimized by stakeholders. Although national studies are recent, research on school effectiveness reaffirms the importance of leadership as a key factor for improving learning (Oliveira; Carvalho, 2018). Regarding management practices, studies have also demonstrated the importance of organizational and structural characteristics of educational systems, which apply to the political-administrative framework and the inequality of resources among schools and municipalities (Sammons, 2008).

While educational context and organizational issues matter on one hand, on the other hand, the debate on how these factors drive or constrain managerial practices is still in its early stages (Warwas, 2015; Tan, 2023). Recently, contingency theory has begun to emphasize that leadership practices should be responsive to different contexts (Bush, 2020). However, studies have been limited to investigating possible adaptations of principals' behavior to specific situations (Warwas, 2015). This trend persists even as we recognize the strengthening, observed in recent years, of studies focused on local determinants in the performance of management practices (Leithwood; Harris; Hopkins, 2019).

In Brazil, not even this thematic resonance has reverberated in the field of research, a gap that is especially relevant in a country marked by regional and intergroup inequalities. When we problematize the existence (or absence) of management practices in schools, ignoring the structural and organizational aspects that permeate basic education can, thoughtlessly, reproduce educational inequalities in the formulation of public policies. In short, initiatives cannot be limited to offering cultural incentives and professional development to principals; they must include, as a basic principle, the equitable allocation of material and human resources.

To address this issue, this article analyzes whether, and how, the composition of school teams affects the management practices adopted by school principals in 138 high schools in the states of Espírito Santo and Piauí. Information on management practices comes from the Management Practices, Educational Leadership, and Education Quality Survey (PGLEQE) (Oliveira *et al.,* 2023). In order to identify which actions amplify students' results in large-scale standardized tests, PGLEQE researchers administered questionnaires to teachers, pedagogical coordinators, and principals, triangulating information to produce diagnoses of leadership profiles. To characterize school teams, we used data from the School Census of Education and

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the contextual questionnaire of the Basic Education Assessment System (SAEB), both collected by the National Institute for Educational Studies and Research Anísio Teixeira (INEP).

In this article, we test the hypothesis that the availability of a quantitatively robust team, that is, with a larger number of professionals i) tasked with school management; ii) involved in administrative, financial, and school space organization support activities; and iii) focused on pedagogical support, is a key factor for principals to implement diverse and well-regarded management practices within the school community, especially those related to collaboration and instructional support.

In addition to this introduction and the section dedicated to presenting the theoretical frameworks, this article is divided into three other sections. The third section presents methodological procedures for data treatment and analysis. The study implements an exploratory factor analysis to develop leadership indicators based on different dimensions. It also conducts path analysis to verify the influence of team composition on leadership practices. Next, the results section contains descriptive data on the selected variables and the findings obtained through econometric analyses. Finally, the concluding remarks underscore the contributions of the article to the field of study, presenting possible avenues for a research agenda.

Theoretical References

The literature on school leadership recognizes that management practices are produced at the interface between the school context and the profiles of principals (Grissom; Loeb, 2011). Both contextual aspects, related to the structure and work environment, and personal characteristics, such as education and professional experience, affect management practices. Hallinger, Bickman, and Davis (1996), for example, identified the influence of the school's socioeconomic level and parental involvement in school management. Likewise, the authors problematize how management practices are influenced by organizational aspects and characteristics of the educational system.

In recent decades, the composition of school teams has aroused researchers' interest, yet the field of study remains in its early stages with sometimes controversial results. Research often describes the factors relevant to why some leadership practices outshine others. According to Bush (2020), the size of the school affects the interpersonal distance among team members, leading to greater isolation in decision-making. Gronn (2002) asserts that in larger institutions,

where there is a more significant number of team members, a director's personal leadership tends to be replaced by institutionalized forms of distributed leadership.

While it is safe to assert that team composition affects the director's work, it is still necessary to understand how organizational capabilities influence leadership practices. This discussion is particularly important in Brazil, where the responsibility for educational provision is shared among federative entities (municipalities, states, and the federal district), granting autonomy to educational networks in defining management teams. This apparent decision-making freedom results in high heterogeneity in the working conditions of school principals.

Within educational networks themselves, the heterogeneous operating conditions of schools (due to aspects such as infrastructure, location, size, profile of the served population, etc.) also pose challenges to management activities. It would be necessary for networks to use parameters to guide the composition of multi-professional teams, but so far, there are no regulations focused on the organizational dimension of school management.

Experiences from the Unified Health System (SUS) and the Unified Social Assistance System (SUAS) can inform this debate. During the formation of these systems, conferences and discussions were held on the provision of services and team composition. The effort was necessary for the implementation of decentralized service delivery, recognizing minimum parameters for the subnational provision of public policies. Bichir, Junior, and Pereira (2020) emphasize that improving decentralized provision is fundamental in countries with federal systems, considering the need to reduce regional inequalities and universalize access.

In the case of healthcare, the structuring of the Family Health Program stemmed from the understanding that service provision depended on the presence of a multiprofessional team responsible for a territory. The notion of a team is associated with a perspective of shared work, which relies on collective action to be successful (Oliveira and Spiri, 2006). Moreira, Vieira, and Costa (2016) state that creating a team of professionals is a challenging process, as it depends on defining the service policy and expectations regarding service quality. There must be clarity about what an "ideal format" of service would be, so that each professional's design, composition, and role can be established.

Regarding the national policy for primary healthcare, not only are the responsibilities of professionals highlighted, but also their common tasks, reinforcing teamwork and the need to address complex issues. The study by Moreira, Vieira, and Costa (2016) assessed the quality of care provided by Family Health Teams, finding that larger teams were better evaluated, attributed to the greater diversity of professional backgrounds. The results suggest that the

presence of a multiprofessional team promotes the reduction of inequalities and the expansion of comprehensive healthcare, as mandated by the Organic Health Law (Moreira; Vieira; Costa, 2016).

In the case of social assistance, the Basic Operational Norm for Human Resources of the Unified Social Assistance System (NOB-RH) establishes the necessary requirements for team composition in public facilities. The Norm defines the ethical principles that should guide the work of professionals and the format of reference teams, including guidelines for individual professional development. Florentino and Melo (2017), for instance, point out that the inclusion of psychology professionals in the composition of SUAS teams represented a milestone for the professionalization of social assistance policy.

But what about education? What would be the minimum parameters for the composition of school management teams and management support? How does the interaction between these professionals affect the distribution of management and leadership practices, especially those recognized as promoting the best educational outcomes? To answer these questions, the literature on state capabilities serves as an important reference, contrasting the influence of individual and organizational aspects (Wu; Howlett; Ramesh, 2018).

State capabilities refer to the set of skills and resources necessary for the exercise of the state's essential functions, related to bureaucratic and organizational skills that are crucial for the implementation of government projects (Direito; Koga; Licio, 2022). Suppose the phenomenon of leadership is understood as a state capability, a managerial capability of school units. In that case, school management results from both the competencies and skills of professionals in leadership positions (their education, experience, and self-efficacy perception), and organizational aspects, which condition individuals' agency by determining the availability of material and human resources.

In this sense, in order to develop a complete framework of public action capabilities, it is worth understanding how individual and organizational factors interact in different educational systems (Howlett, 2018). In other words, competencies, skills, and available resources combine in the development of leadership practices, a reflection that should guide public and academic discourse on management work.

Method

This article seeks to investigate whether the availability of a quantitatively robust team, with an appropriate composition of school management professionals, is a key factor for principals to exercise leadership, especially in topics related to collaboration and instructional support.

To test the hypothesis that team composition affects leadership practices, the article utilizes the following theoretical model:

Figure 1 - Theoretical Model[6]
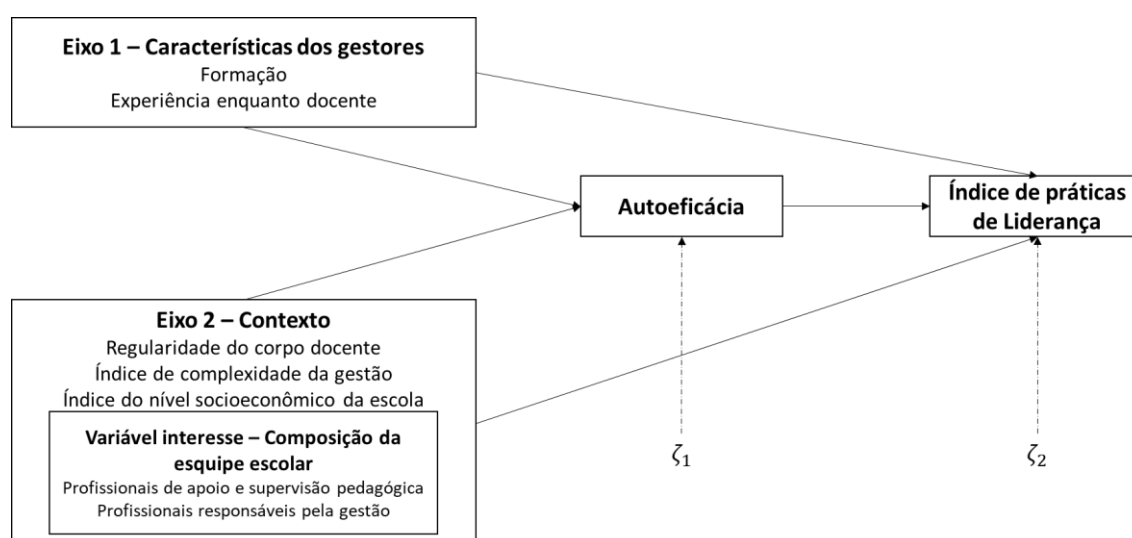
Source: Authors' elaboration.

Path analysis was used to test the strength of relationships between variables. Given the complexity of social life, discriminating these relationships is often a difficult task, which justifies the use of the method for studying complex social systems (Lleras, 2005). As a method commonly used in testing theoretical models, path analysis requires the explicitation of hypotheses about the relationships between variables. Figure 1 presents the relational flow of variables in a diagram.

The literature often focuses on the role of principals' education and associated characteristics, such as knowledge, skills, and values, in management work (Naidoo, 2019). To address this issue, the first analytical axis of Figure 1 identifies the profile characteristics of school principals, specifically education and teaching experience. In order to maximize the sensitivity of the variables, the scales were adapted, considering the distribution of responses.

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[6] Axis 1: Characteristics of managers; Axis 2: Context - regularity of the teaching staff; Management complexity index; Index of the school's socio-economic level; Self-efficacy; Index of leadership practices.

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Education was operationalized through a dummy variable, which takes the value 1 when higher education is in Pedagogy and 0 for a teaching degree or other education. Regarding teaching experience, the data corresponds to the principal's statement of years of teaching experience.

In turn, self-efficacy indicates the principal's assessment of their ability to conduct school activities. This does not mean that self-efficacy beliefs are necessarily associated with task performance. Guerreiro-Casanova and Azzi (2013) assert that self-efficacy intervenes in the cognitive and motivational aspects of principals, thus justifying its inclusion in the model as a mediating variable.

The second analytical axis seeks to measure the degree of relationship between contextual aspects and leadership practices, as well as their interference with school principals' self-efficacy perception. According to Tan (2023), this type of variable is still uncommon in econometric models focused on management practices. In our model, we include the regularity of the teaching staff[7], the school management complexity index[8] and the school's socioeconomic level index[9].

In the calculations, the inclusion of management complexity and school socioeconomic level serves not only to elucidate the influence of these factors on leadership practices but also to control the results for school characteristics, such as size (in the case of management complexity) and student body profile (in the case of socioeconomic level). The analysis is performed separately for a sample of schools from the state networks of Espírito Santo and Piauí, as the relationships between variables may differ depending on the characteristics of the educational system.

Still, within the second axis, another set of variables addresses the main research hypothesis: the influence of school team composition on leadership practices and principals' self-efficacy perception. The variable of interest identifies the presence of a pedagogical support team that complements management work. Information from the Basic Education

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[7] The indicator is calculated by INEP based on data from the Basic Education Census. Its purpose is to assess teachers' retention in schools over the last five years, with each teacher being assigned a score ranging from 0 to 5. In the regression model, we use the average regularity of the school's teaching staff.

[8] The management complexity indicator is part of the Basic Education Census disclosures, which are the responsibility of INEP. Management complexity is related to the school's size, number of operating shifts, quantity, and complexity of offered modalities/stages. Schools are classified into levels from 1 to 6. In the analyzed sample, there are schools with management complexity index ranging from 2 to 6. Level 2 refers to schools with enrollment between 50 and 300 students, 2 shifts, offering up to 2 stages of education, with Early Childhood Education or the Initial Years as the highest stage; whereas level 6 refers to schools with enrollment over 500 students, 3 shifts, offering 4 or more stages of education, with Adult Education as the highest stage.

[9] The socioeconomic level indicator uses information collected from the SAEB students' questionnaire to establish a measure of students' socioeconomic level. The school's average INSE, the school's classification into 8 socioeconomic level groups, and the percentage of students from the school in each of the 8 socioeconomic level groups are disclosed. For the proposed analysis, we use the school's average level (continuous variable).

School Census was considered, considering the number of professionals working in the school as pedagogical support and supervision professionals (pedagogical coordinator, educational counselor, school supervisor, and teaching area coordinator), as well as the number of professionals working in the school as vice-principals or deputy principals, and finally, professionals responsible for administrative and/or financial management.

Construction of Variables for the Model

If indicators of education and experience are already available in the PGLEQE microdata, other indicators, such as self-efficacy and leadership practices, require additional calculations. To construct a synthetic indicator of self-efficacy, data from the questionnaire answered by school principals were used. The sample contains 138 principals from state schools in the networks of Espírito Santo and Piauí (70 and 68 principals, respectively[10]). Since the model proposed by PGLEQE indicates only 7 items from the questionnaire associated with professionals' self-efficacy perception, the sample size meets the minimum criterion for applying exploratory factor analysis.

All items related to self-efficacy are categorical variables, which led us to use exploratory factor analysis with polychoric correlations (Matos, Rodrigues, 2019). Regarding the correlation matrix between variables, none of the correlations is less than 0.3.

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[10] The difference between the samples from Espírito Santo and Piauí stems from a problem in the questionnaire registration. The principal's questionnaire in Piauí was answered by 70 individuals in 69 schools, meaning that in one educational unit, more than one professional answered the questionnaire and registered as a principal. Therefore, it was decided to exclude these two responses from the database, as it was not possible to identify which of the two entries actually corresponded to the school principal's response.

Figure 2 - Correlation Matrix - Principals' Questionnaire, Questions on Self-Efficacy
(Espírito Santo and Piauí)
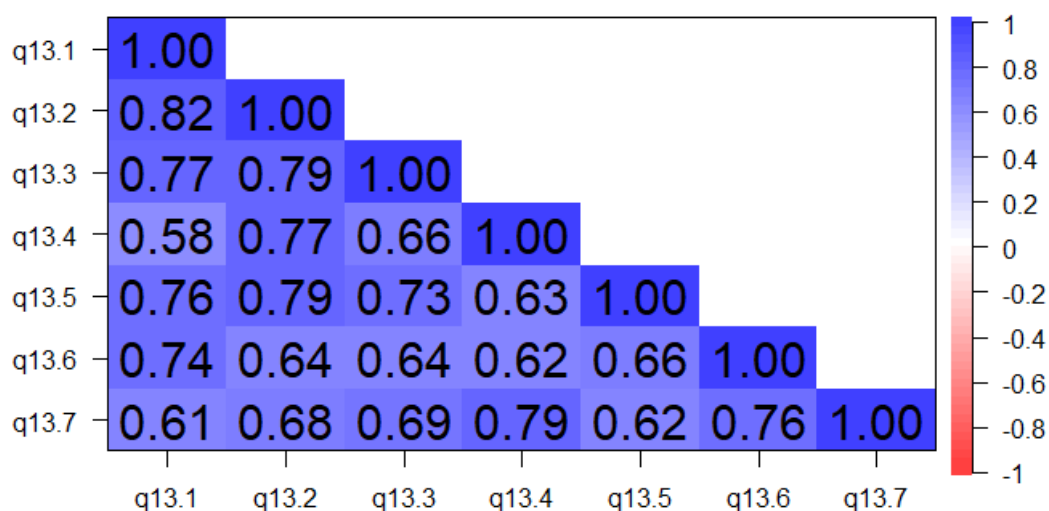
Source: Authors' elaboration.

To test the validity of the database, we conducted Bartlett's test, which revealed a statistically significant Chi-square (χ^2=959,8591, df=21, p<0,001), indicating that the variables are sufficiently correlated for the application of factor analysis. Additionally, the Kaiser-Meyer-Olkim (KMO) test revealed an overall adequacy index of 0.88. All items showed high values (greater than 0.8), indicating an overall optimal fit of the data for the application of exploratory factor analysis.

To determine the number of factors to be extracted, we used Kaiser's criterion (number of eigenvalues greater than 1), the Parallel Analysis (PA) method criterion, and the criterion of percentage of accumulated variance. All criteria indicate only one latent factor. Considering the extraction of the single latent factor, no item showed a low communality level (less than 0.3). A low level of commonality would indicate that the item's variance is not sufficiently explained by the extracted factor, which could occur if the item is not associated with the extracted factor or if the sample does not provide the necessary information to capture the variance.

All items showed a positive loading with considerable magnitude on the extracted factor, ranging from 0.79 to 0.93. Regarding the overall assessment of the analysis, the factor explains 72% of the total variance, and the model shows an adequate fit, with RMSR (Root Mean Square of the Residuals) of 0.06.

Leadership practices also required the creation of synthetic variables. Once again, we used exploratory factor analysis, considering the items from the PGLEQE questionnaires that

were answered by teachers about the leadership practices existing in their schools[11]. The indicator was defined by identifying latent factors. Respondents were asked to indicate, on a scale of 1 to 4, their degree of agreement regarding a list of statements about the presence of certain managerial practices. Since we are dealing with categorical variables, we maintained the use of exploratory factor analysis with polychoric correlations (Matos; Rodrigues, 2019).

The database includes responses from teachers in the public state education networks of Espírito Santo (682 respondents) and Piauí (619 respondents), totaling a sample of 1,301 observations, which meets the minimum size criterion recommended for factor analysis[12]. It is worth noting that the study of teachers' perceptions of principals' work, aimed at constructing indicators of school leadership, is a common procedure in educational research (Aytac, 2015; Franco; Sztajn; Ortigão, 2007; Toytok; Kapusuzoglu, 2016).

Regarding the correlation matrix between variables, only 3% of the correlations reached a value below 0.3. With the exclusion of one item that was poorly correlated with the others, a new correlation matrix was generated to enhance the sample's adequacy. Additionally, to test the validity of the dataset, Bartlett's test was conducted, which indicated a statistically significant Chi-square ($\chi^2 = 88217,59, df = 1326, p < 0,001$). In other words, the variables are sufficiently correlated for the application of factor analysis.

Furthermore, the Kaiser-Meyer-Olkim (KMO) test was performed to assess the adequacy of the database. The result informed an overall adequacy index of 0.96, attesting to an overall optimal fit of the data for exploratory factor analysis. Moreover, all items showed values above 0.9, significantly contributing to the factorial structure.

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[11] The questions 11, 12, 15, 16, and 17 were selected, as presented on RPubs (http://rpubs.com/bsgarcia028/bento-et-al-2024) following the theoretical and methodological guidelines of the Research on Management Practices, Educational Leadership, and Education Quality (PGLEQE).

[12] The number of observations exceeds 5, multiplied by the number of variables analyzed (Matos and Rodrigues, 2019). In this study, there are 53 categorical variables.

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Figure 3 – Correlation matrix, after exclusion of item 17.3 (teachers' questionnaire – Espírito Santo and Piauí)
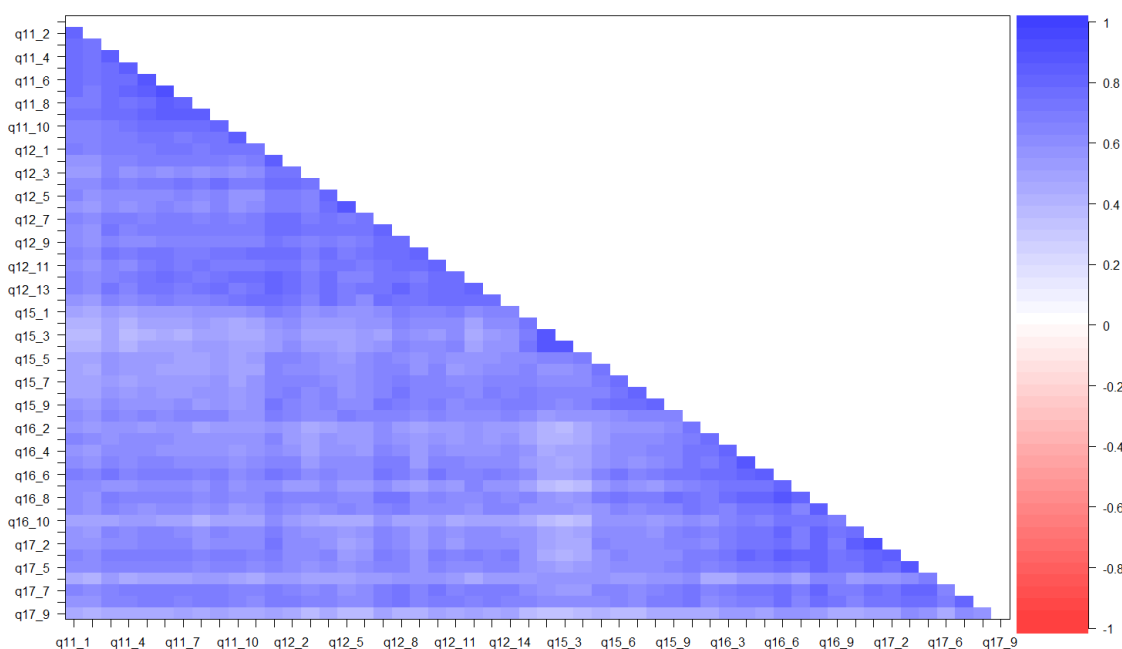
Source: Authors' elaboration.

To determine the number of factors, we implemented, as in the case of self-efficacy, the Kaiser criterion, the Parallel Analysis (PA) method criterion, and the criterion of percentage of accumulated variance. We also proceeded with the application of exploratory factor analysis with maximum likelihood estimation and oblique[13] rotation between factors. The most suitable result, according to the Kaiser criterion, involves the extraction of 4 latent factors[14], explaining 72% of the total observed variance and having an adequate fit, with RMSR of 0.03.

From the results of the exploratory factor analysis, we calculated an index of Leadership Practice (IPL) for each of the four latent factors. The calculation was based on the aggregation of the items composing each factor. The item information was reclassified as a dummy variable, where only responses indicating "fully agree" are assigned a value of 1. This exercise was necessary for two reasons. First, the research aims to capture how the composition of teams contributes to the adoption of practices considered "ideal," and thus, we understand it is

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[13] This method is recommended for social studies, as it considers the hypothesis that the extracted factors may be correlated with each other (Matos, Rodrigues, 2019).

[14] Considering the extraction of 4 factors, it was noted that items 15.1, 15.5, 15.6, and 15.9 of the questionnaire showed equally high loadings in more than one factor. Although this model still yielded better results compared to the others, we chose to proceed with the four factors but excluded items q15.1 and q15.5. Items q15.6 and q15.9 were retained in the model, as we set a flexible criterion to accept loadings with factors within a difference of 0.05 from the loadings of the other factors. Furthermore, the questions contained in the questionnaires provide a relatively broad description of the use of Information and Communication Technologies (ICTs) and the topics discussed by the principal with the teachers, which does not allow for a clear identification of what would constitute an ideal leadership practice.

necessary to highlight among the leadership practices only those in which there is full agreement on their implementation in the school. Second, upon analyzing the frequency of responses, we noticed slight divergence among teachers, with a tendency toward more excellent agreement, making the original metric less sensitive to variations.

For the construction of the indicators, we calculated the mean of the teachers' responses from the same school for each selected item derived from the factor analysis. Then, the school indicators are calculated as the average of these items for each factor. The formula for constructing factor 1, from the 19 items that compose it, for a given school, is:

$$IPL\_1_e = \sum_{i=1}^{19} \square \frac{1}{19} \sum_{n=1}^{N_e} \square \frac{item_{i,n}}{N_e}$$

Where e is the school to which the factor 1 indicator refers; N_e is the total number of teachers who responded to the survey for the school e; and $item_{i,n}$ is the response of teacher n to item i. The indicators for the other factors follow the same logic.

The qualitative analysis of the allocation of items among the four factors[15] allowed for the identification of the following leadership dimensions:

- Factor 1 – encompasses items describing the school principal's involvement in pedagogical actions aimed at student retention, promoting learning, and ensuring basic operational conditions;
- Factor 2 – includes the school principal's involvement in directing and guiding teams;
- Factor 3 – deals with the school principal's relationship with professionals and the school community;
- Factor 4 – addresses the school principal's involvement in classroom observation activities.

Treating item responses as dummies, the IPL indicators for each factor vary between 0 and 1.

The complete regression model is expressed as follows:

(01) $\quad IPL_1 = \alpha_1 + \gamma_{F,1}F + \gamma_{ED,1}ED + \gamma_{RD,1}RD + \gamma_{CG,1}CG + \gamma_{INSE,1}INSE +$
$\quad\quad \gamma_{PP,1}PP + \gamma_{PG,1}PG + \gamma_{AE,1}AE + \zeta_1$

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[15] See item IV of RPubs (http://rpubs.com/bsgarcia028/bento-et-al-2024).

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(02) $\quad AE = \alpha_{AE} + \gamma_{F,AE}F + \gamma_{ED,AE}ED + \gamma_{RD,AE}RD + \gamma_{CG,AE}CG + \gamma_{INSE,AE}INSE + \gamma_{PP,AE}PP + \gamma_{PG,AE}PG + \zeta_{AE}$

Where:

F = Formation

ED = Teaching Experience

RD = Regularity of the teaching staff

CG = Complexity of Management

$INSE$ = Socioeconomic level index

PP = Pedagogical support professionals

PG = Management professionals

AE = Self-efficacy

α = Intercepts

ζ = Residuals of the regressions

Where γ expresses how much each variable contributes to the leadership practices indicator observed by equation 01, or to the perception of self-efficacy in equation 02.

Data Analysis

To examine the relationships between the independent variables, the mediating variable, and the indices of leadership practices, we implemented the path analysis method using the lavaan package in RStudio. Calculations were performed separately for the state education networks and for each of the 4 leadership dimensions[16].

The main challenge is the sample size in each state compared to the number of estimated parameters in the model. Nonetheless, some parameters related to the fit of the models are adequate (low RMSEA; CFI and TLI equal to 1)[17]. Given the adequacy of these parameters, combined with the theoretical model test and the adoption of parsimony in discussing the results, we understand that the exercise is opportune.

The results obtained for each state differ substantially. In Piauí, for all four leadership factors (1. Principal's involvement in pedagogical actions; 2. Principal's participation in team guidance actions; 3. Principal's relationship with the school community; 4. Principal's role in

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[16] See RPubs (http://rpubs.com/bsgarcia028/bento-et-al-2024);
[17] For this article, we used the specifications described in Bean (2021).

classroom observation), no significant direct relationships were observed between the variables and leadership practices.

However, when considering possible indirect pathways of effect, the Management Professionals (PG) variable is positively associated with directors' self-efficacy (AE). This means that, for the sample from Piauí, the presence of a greater number of professionals working in the school as vice-principals or assistant principals, as well as professionals responsible for administrative and/or financial Management, is related to positive perceptions by the director about their ability to act. This was the only variable in the entire model that showed statistical significance. Below, Figure 4 omits the non-significant associations to present the results in a simpler manner, a procedure replicated in subsequent stages of the text.

Figure 4 - Result of statistically significant relationship for the case of Piauí[18]
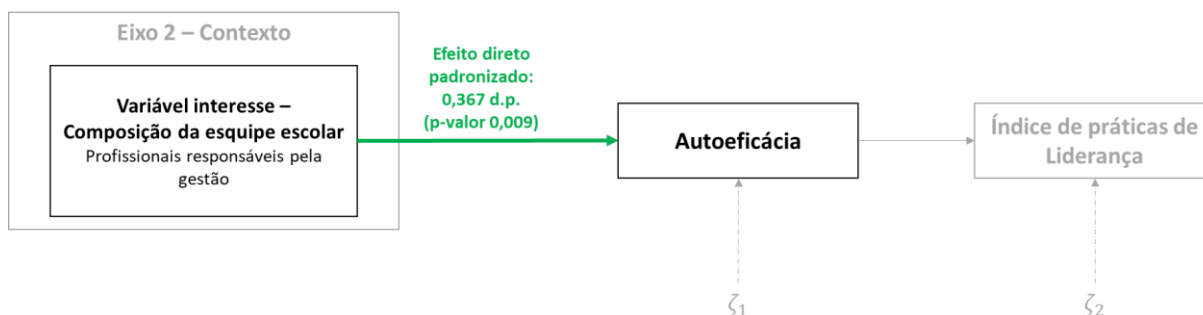
Source: Authors' elaboration.

For the sample from Espírito Santo, the estimates indicate direct relationships between the variables, which applies to the indicators of leadership practices and the directors' self-efficacy perception. This latter variable is positively associated with the leadership indicators, in line with evidence from the academic literature. Additionally, in three of the four leadership factors (1. Principal's involvement in pedagogical actions; 2. Principal's involvement in team guidance actions; 3. Principal's relationship with the school community), a negative association is noted between the quantity of pedagogical support and supervision professionals and leadership practices, which is also observed in the relationship between pedagogy education and the dependent variable.

Although there is a statistically significant association between education and leadership practices, it is inappropriate to interpret this result as a causal effect. Given the limitations of the available data, the characteristics of the directors were not exhaustively addressed, and thus,

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[18] A variation of 1 standard deviation in the number of professionals responsible for management is associated with an increase of 0.30 standard deviations in the level of self-efficacy of directors.

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it is possible that variables correlated with education were left out of the model, which may produce spurious correlations.
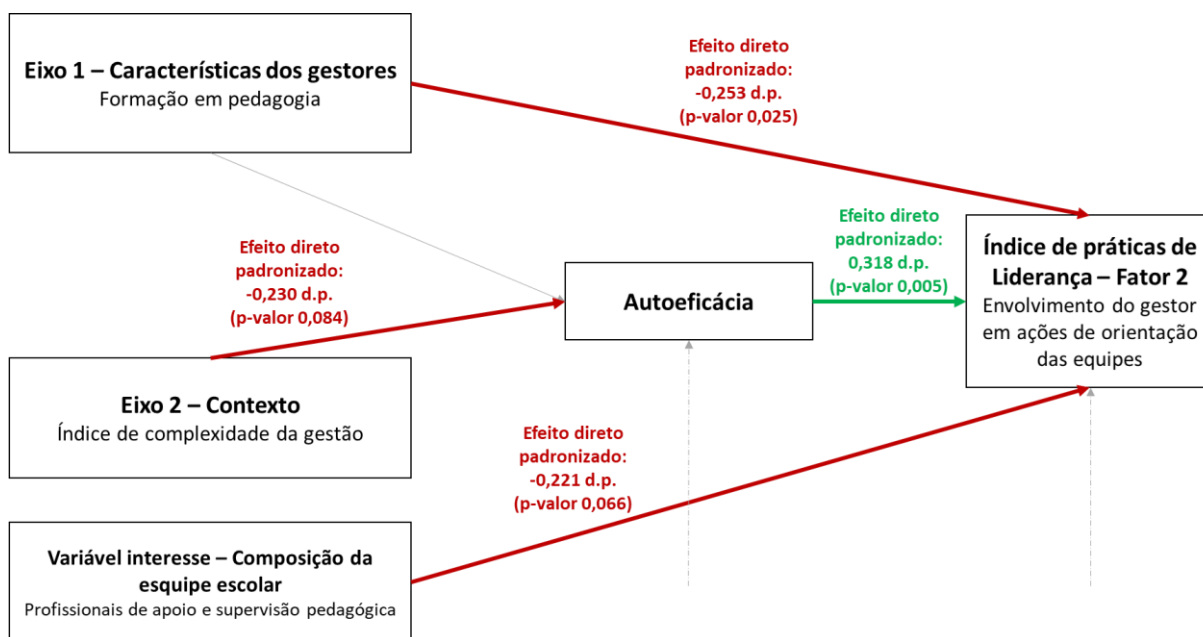
Figure 5 - Result of statistically significant relationships on Principal's involvement in pedagogical actions (Factor 1) for the case of Espírito Santo[19]
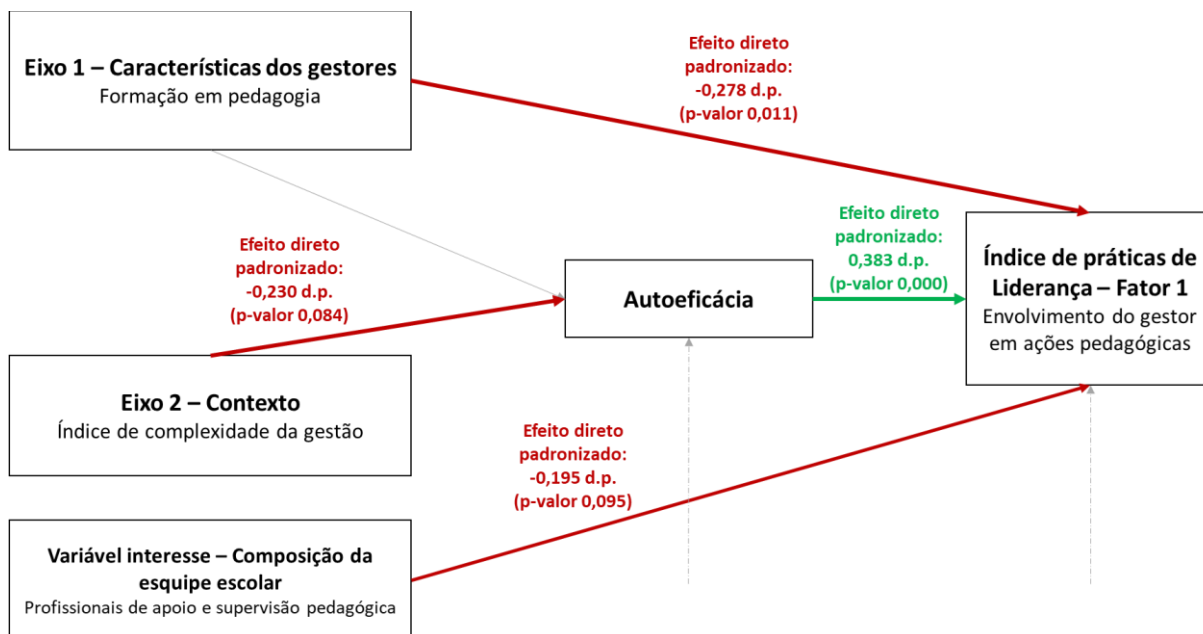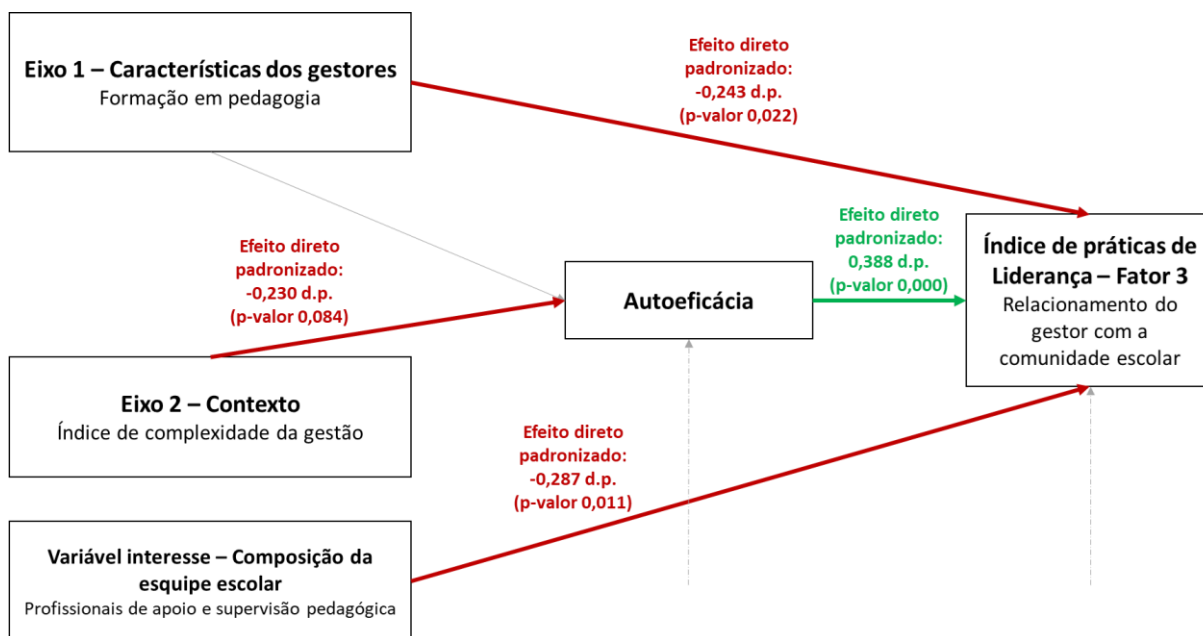

Source: Authors' elaboration.

Figure 6 - Result of statistically significant relationships on Principal's involvement in team guidance actions (Factor 2) for the case of Espírito Santo[20]

Source: Authors' elaboration.

Figure 7 - Result of statistically significant relationships on the Principal's relationship with the school community (Factor 3) for the case of Espírito Santo[21]
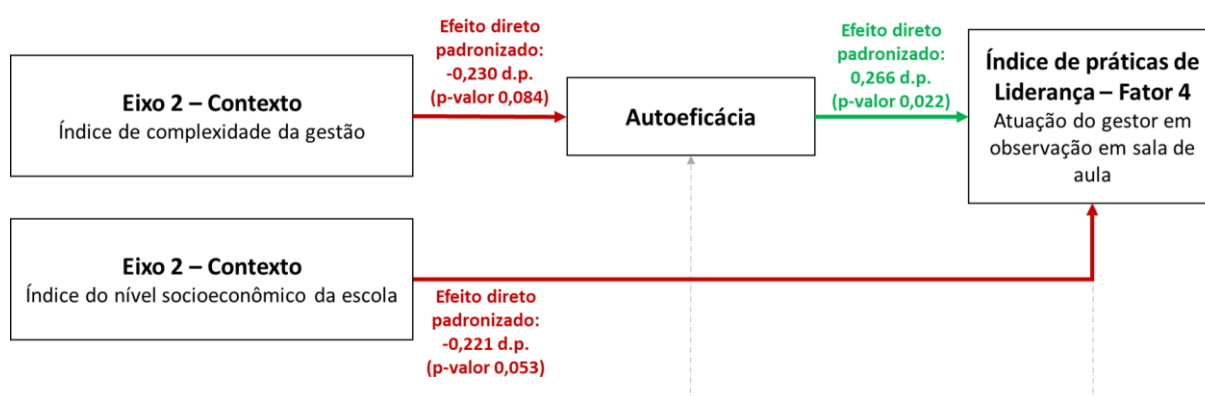

Source: Authors' elaboration.

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[20] Axis 1 - Characteristics of managers; Axis 2 - Context: Management complexity index; Interest variable - composition of the school team; Self-efficacy; Leadership practices index - Factor 2: Involvement of the manager in team guidance actions.

[21] Axis 1 - Characteristics of the managers; Axis 2 - Context: Management complexity index; Interest variable - composition of the school team; Self-efficacy; Leadership practices index - Factor 3: Relationship between the manager and the school community.

Figure 8 - Result of statistically significant relationships on Principal's classroom observation actions (Factor 4) for the case of Espírito Santo[22]

Source: Authors' elaboration.

There are still doubts about what explains the negative association between a greater number of educational professionals and leadership indicators. However, it is worth noting that the variable captures only the number of professionals, without including parameters indicating what multiprofessional work in schools would entail. The presence of more professionals, without the appropriate design of relationship channels, can lead to a specialization of the principal's work, which would have negative effects on their leadership practices. This result resonates with the contributions of Placco, Almeida, and Souza (2014), who highlight the mismatch between the expectations that the management team and the school community have regarding the work of the pedagogical coordinator.

Furthermore, beyond the degree of support provided to the principal, the composition of the pedagogical support team can reflect different management models. In schools with a greater number of professionals, management practices may develop collaboratively, through the sharing of tasks with other professionals. If confirmed by additional research, this phenomenon reflects the process commonly observed in robust management teams of institutionalizing a distributed leadership model (Gronn, 2002). These hypotheses should be tested with new information and by articulating quantitative and qualitative analysis techniques through studies dedicated to the types of work relationships among professionals and operational flows in the daily life of schools.

Still, for the sample from Espírito Santo, for the fourth leadership factor (4. Principal's classroom observation actions), a positive association is noted between the principal's self-

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[22] Axis 2 - Context: Management complexity index; Axis 2 - Context: School socio-economic level index; Self-efficacy; Leadership practices index - Factor 4.

efficacy perception and leadership practices, with the opposite occurring when analyzing the association between the school's socioeconomic level and the dependent variable. The results indicate that the higher the school's socioeconomic level, the less the use of classroom observations by principals. The association between the school context and pedagogical practices, articulating working conditions and the strategies used in "challenging" scenarios, goes beyond the objectives of this article.

In terms of indirect effects on leadership practices, in the sample from Espírito Santo, in all four dimensions analyzed, the complexity of management is negatively associated with principals' self-efficacy perception. That is, in multi-grade schools and those with a higher number of students, principals tend to judge themselves as less capable of performing a positive leadership role, given the challenges posed to school management.

Final considerations

Research on educational policies attests that school management is fundamental for improving learning outcomes. However, understanding to what extent this management depends on organizational and structural factors, such as defining roles and work performed by multidisciplinary teams, is still a little-discussed topic.

This article analyzed the importance of the school team composition for establishing leadership practices. Additionally, it aimed to demonstrate that theoretical frameworks of Public Administration (especially the discussion on parameters for team composition and the provision of social policies in federative contexts) and the literature on state capacities underpin the development of a new research agenda, articulating individual and organizational factors.

We have seen that not only do the relationships between variables and leadership practices differ between states, but they also depend on the analyzed practices. In this regard, we grouped the practices into four groups: pedagogical support, direction establishment, relational, and classroom observation.

In the schools sampled from Piauí, there are no significant direct effects on leadership practices, although the composition of the school team has had a substantial effect on the principal's self-efficacy. In contrast, in the sample from Espírito Santo, both direct and indirect relationships were observed, which underpins reflections on the organizational and structural aspects that define leadership practices.

Previous studies have already identified differences in leadership practices between the two states. Santos *et al.* (2023), using data from the Brazil exam, captured more diverse and well-developed practices in Espírito Santo than in Piauí. The results reiterate the discrepancies between the territories, a theme that can be explored by future research to identify which factors, possibly the structural characteristics of the education networks, produce such phenomena.

In the sample from Piauí, the perception of the school principal's self-efficacy seems to be influenced by the presence of more professionals in management teams. Although the evidence raises doubts, it is possible that the principal's belief in their own abilities is related to their perception of the sufficiency or adequacy of the number of support professionals in management. If the hypothesis is confirmed, problems in the composition of school teams negatively reverberate in daily work, generating a perception of lack of support, which undermines positive self-images by principals.

Quantitative and qualitative research focused on workflow and the composition of school management teams in Piauí can contribute to this research agenda. It is also worth investigating the existing legislation regarding team composition, as well as the hiring practices of professionals and whether there are issues with turnover. Another relevant initiative is mapping the possible shortage of management professionals in certain schools and educational regions. Taken together, these themes elucidate the effect of socioeconomic inequalities on the distribution of professionals, identifying possible mismatches between principals' support expectations and the current parameters guiding team design.

In the case of the sample from Espírito Santo, there is a negative association between the presence of more pedagogical support professionals and leadership practices. Although inconclusive, this evidence seems to be caused by some phenomena. A team with more professionals can generate substitution effects, where the actions of other professionals supplant the leadership work of the principal. Additionally, a higher number of professionals, without a specific design for the distribution of their functions, can cause operational dysfunctions. It is worth noting that the results are controlled by the characteristics of the schools, such as socioeconomic level and complexity index, which includes the number of enrollments in its calculation.

For the development of the research agenda, it is important to look at national policies and state regulations, seeking to understand how regulatory aspects affect expectations regarding the work of school principals and the performance of multidisciplinary teams. We reiterate that Placco, Almeida, and Souza (2014) identify a gap in studies on the work of

pedagogical coordinators in the federative units, which sometimes leads to conflicts and role deviations.

As there is no definition of the performance of multidisciplinary teams in primary education similar to what is observed in health and social assistance, qualitative studies analyzing these workflow processes are still necessary. In the two states that were the subject of this article, it is also worth investigating the professional profiles that makeup school teams, hiring practices, and teacher turnover. These indicators help identify possible governance issues within the teams, a topic beyond the scope of this article but focused on the availability of professionals.

The data collected by PGLEQE constitute an essential source of information on the relationships between teachers, pedagogical coordinators, and principals. Therefore, triangulating the information can support a typology of schools, characterizing the relationship dynamics among professionals. This effort can support the design of multidisciplinary teams that are tailored to the different operational demands of schools, considering the characteristics of the teams and the governance structures necessary for managing school activities.

In terms of the model used, we remember that the sample size (about 70 schools per network), compared to the number of variables of interest, limits our analysis capacity. Although the model parameters have been appropriate, it is necessary to adopt some parsimony in interpreting the results. For the field of study, the article's main contribution is the evidence that the composition of teams is fundamental for the development of leadership practices. Certainly, further studies with larger samples that can capture qualifying variables of the relationship between professionals, not just their presence in schools, are still needed.

Regardless of the suggested developments here, the article presents pertinent results that dialogue with the literature on the subject. The theoretical model and dialogue with the literature on public policies and state capacities also represent important advances, strengthening the development of a research agenda and policy formulation.

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