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Knowledge management and school dropout in High School: subsidies for decision-making and improvement of educational quality in public schools in Paraná

Gestão do conhecimento e evasão escolar no Ensino Médio: subsídios para a tomada de decisão e melhoria da qualidade educacional nas escolas públicas do Paraná

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Abstract

School dropout in High School in Brazil is a critical problem that compromises the quality of education and the future of thousands of young people. In view of this scenario, this study aimed to analyze how knowledge management (KM) can contribute to reducing school dropout in High School in public schools in the state of Paraná. The methodology adopted includes a literature review and content analysis, in addition to correlation analysis with data from the School Census. The study highlights that school dropout is linked to school infrastructure, especially in High School, correlating the number of enrollments with school infrastructure by more than 50%. KM should be used in educational management in order to prioritize strategies that are directly related to the National Education Plan, focusing on the implementation of better structures and pedagogical support for professionals, seeking to reduce dropout.

Keywords: school infrastructure; educational management; school census; quality of education.

Resumo

A evasão escolar no Ensino Médio no Brasil é um problema crítico que compromete a qualidade da educação e o futuro de milhares de jovens. Diante desse cenário, este estudo teve como objetivo analisar como a gestão do conhecimento (GC) pode contribuir para a redução da evasão escolar no Ensino Médio nas escolas públicas do estado do Paraná. A metodologia adotada inclui uma revisão de literatura e análise de conteúdo, além de análise de correlação com dados do Censo Escolar. O estudo destaca que a evasão escolar está ligada à infraestrutura da escola, principalmente no Ensino Médio, se correlacionado o número de matrículas à infraestrutura da escola em mais de 50%. A GC deve ser utilizada na gestão educacional de forma a priorizar estratégias que estejam diretamente relacionadas ao Plano Nacional de Educação, com foco na implementação de melhores estruturas e apoio pedagógico aos profissionais, buscando a diminuição da evasão.

Palavras-chave: infraestrutura escolar; gestão educacional; censo escolar; qualidade da educação.

INTRODUCTION

School dropout in High School is a challenge that significantly affects the quality of education in Brazil, impacting schooling rates and the future of thousands of young people. Data from

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the study "*Combate à evasão no Ensino Médio: desafios e oportunidades*", by Firjan SESI, in partnership with the United Nations Development Programme (PNUD), highlight that half a million young people over the age of 16 drop out of school each year in Brazil (Programa das Nações Unidas para o Desenvolvimento, 2023).

According to Instituto Unibanco (2013), individuals with higher levels of schooling tend to participate more actively in the labor market and, when employed, are less likely to face unemployment. A higher degree of education is related to higher wages and faster economic growth in countries. In addition to economic benefits, education is also associated with advantages in other areas, such as better health, reduced crime, lower rates of teenage pregnancy, and greater social cohesion (Instituto Unibanco, 2013).

In this context, knowledge management (KM) emerges as an approach to support pedagogical and administrative decision-making, providing tools and practices that help identify the causes of school dropout and contribute to the development of strategies to combat dropout and improve the quality of education. KM involves the capture, organization, sharing, and use of information within an organization. In the school environment, KM offers opportunities for teachers and administrators to share tacit knowledge in order to improve teaching and learning processes, as well as to make decisions related to daily activities (Minioli; Silva, 2013).

In this context, educational decision-making guided by knowledge management becomes a strategic element for addressing school dropout in High School, as it enables the systematic analysis of institutional data, performance indicators, and contextual information about students (Hoffmann; Nunes; Muller, 2019). By transforming data into structured and shared information, KM strengthens managers' ability to identify risk patterns, prioritize resources, and implement evidence-based actions, reducing reactive and fragmented approaches (Hoffmann; Nunes; Muller, 2019; Minioli; Silva, 2013).

Studies and technical reports indicate that the use of educational databases and the organization of institutional knowledge increase the accuracy of pedagogical and administrative decisions, contributing to more effective interventions aimed at student retention and academic success (Gouvea; Langui; Correa, 2025). Furthermore, by promoting the circulation of knowledge among different school actors, knowledge management improves decision-making processes and supports the development of integrated strategies to prevent school dropout (Hoffmann; Nunes; Muller, 2019; Minioli; Silva, 2013).

Considering the economic benefits and the improvement in young people's living conditions, the following guiding questions arise for this study: Why do a considerable number of Brazilian students drop out of High School? How can the data released by the School Census be used in decision-making regarding pedagogical strategies?

Therefore, this article seeks to analyze how knowledge management can contribute to reducing school dropout in High School, providing support for decision-making aimed at improving educational quality in public schools in the state of Paraná Therefore, this article seeks to analyze how knowledge management can contribute to reducing school dropout in High School, providing support for decision-making aimed at improving educational quality in public schools in the state of Paraná

METHOD

This exploratory study of a qualitative–quantitative nature involved a literature review, content analysis, and inferential statistics. The analysis is based on data from the School Census and specialized literature, with the aim of exploring how the strategic use of information can promote more inclusive educational practices.

For the search of references in the review, the databases Biblioteca Digital Brasileira de Teses e Dissertações (BDTD) and Scientific Electronic Library Online (SciELO) were used, with the consultation period defined between the years 2013 and 2024. This time frame falls within the process of development and implementation of the Plano Nacional de Educação (PNE), which was sanctioned in 2014 with a validity period of 10 years. Therefore, the analysis of the articles makes it possible to identify whether the strategies proposed by the PNE were properly implemented and whether the proposed goals were effectively achieved.

Search terms were used to cover the main themes of the study, such as "school dropout," "high school," and "technical education." Specific filters were applied to restrict the search to the period of interest and to the presence of the terms in titles, keywords, abstracts, or subjects. Data collection took place in March and April 2024 for articles in Portuguese. For this purpose, a Web Scraping script was developed, a technique that consists of the automatic extraction of information from online platforms. According to Pereira (2021), Web Scraping "[...] is the collection of data from several websites, later aggregated for analysis or storage".

In the Scientific Electronic Library Online (SciELO) database, 96 articles were initially identified. After applying a filter to select only texts in Portuguese, 52 articles remained. The analysis of the titles resulted in the exclusion of 38 articles, leaving 14 for full reading, of which 10 were selected. In the Biblioteca Digital Brasileira de Teses e Dissertações (BDTD), 154 studies were initially identified; after the application of filters, 122 theses and dissertations were selected, of which 29 were used.

The analysis of the textual content was carried out using the free software IRAMUTEQ, which allows various types of textual analysis, such as basic lexicography and multivariate analyses (Camargo; Justo, 2013).

For the quantitative analysis of the factors that may influence school dropout in State Schools in the state of Paraná, descriptive statistics were conducted using census data from 2013 to 2023. The data are publicly available from the Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (INEP) on its website (Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira, 2020).

After a detailed analysis of all attributes, carried out based on the data dictionary provided by the census, it was observed that although some attributes appeared in the dictionaries, the corresponding data were not consistently available across the years. These attributes only began to be presented in a complete manner starting in 2019. Of the 45 attributes initially selected, 10 were removed because they were not present in at least 50% of the analyzed years. However, among the 35 attributes that remained, half are correctly presented only from 2019 onward. Given this finding, and recognizing that these data are relevant for correlation analysis, it was decided to apply a temporal cut for the analysis. Thus, it was decided to conduct the analysis of enrollments over the last 11 years. However, for inferential analyses, a temporal cut starting in 2019 was established.

Correlation analyses were conducted between different variables. The selection of attributes was carried out based on the structural aspects of the schools. The objective of the analyses was to verify whether structural and technological conditions significantly influence the teaching and learning process of students, considering that their absence could induce or increase school dropout. In this way, a variable representing the percentage presence of structural elements in the schools was constructed, in which the presence or absence of certain attributes was quantified and then summed and divided by the total number of selected attributes. The variables used to construct this indicator are described in Chart 1.

Since the data are publicly accessible, this study did not require review by a Research Ethics Committee, according to the regulations of the Conselho Nacional de Saúde (466/12 and 510/16). However, the authors reaffirm that all ethical aspects expected in the conduct of research were followed.

RESULTS AND DISCUSSION

The inclusion of new attributes in the School Census starting in 2019 reflects a series of social, educational, and technological factors that have emerged in recent years. These attributes were introduced for several reasons, as shown in Chart 2.

Regarding technological resources, data from the *Basic Education Census Notebooks* published by the Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira, 2021, 2022, 2023) show a significant evolution in the availability of technology in High Schools in Brazil, highlighting the increasing integration of these resources into the educational environment. In 2014, 86.4% of schools had computer laboratories, a percentage that slightly decreased

Chart 1. Composition of the structural factor of schools, based on the variables from the Basic Education Census and their descriptions.

Variable	Description
IN_PRÉDIO_COMPARTILHADO	Building shared with another school
IN_ÁGUA_INEXISTENTE (R)	Water supply – No water supply
IN_ENERGIA_INEXISTENTE (R)	Electricity supply – No electricity
IN_ESGOTO_INEXISTENTE (R)	Sanitary sewage – No sewage system
IN_ÁREA_VERDE	Existing and used physical facilities in the school – Vegetated or grassy area
IN_BANHEIRO	Existing and used physical facilities in the school – Bathroom
IN_BIBLIOTECA	Existing and used physical facilities in the school – Library
IN_COZINHA	Existing and used physical facilities in the school – Kitchen
IN_LABORATÓRIO_CIÊNCIAS	Existing and used physical facilities in the school – Science laboratory
IN_LABORATÓRIO_INFORMÁTICA	Existing and used physical facilities in the school – Computer laboratory
IN_PÁTIO_COBERTO	Existing and used physical facilities in the school – Covered courtyard
IN_PÁTIO_DESCOBERTO	Existing and used physical facilities in the school – Uncovered courtyard
IN_QUADRA_ESPORTES	Existing and used physical facilities in the school – Indoor or outdoor sports court
IN_SALA_ATENDIMENTO_ESPECIAL	Existing and used physical facilities in the school – Multifunctional Resource Room for Specialized Educational Assistance (AEE)
IN_ACESSIBILIDADE_INEXISTENTE (R)	Accessibility resources for people with disabilities or reduced mobility in internal circulation areas – None of the listed accessibility resources
IN_EQUIP_SOM	Equipment available in the school for teaching and learning processes – Sound system
IN_DESKTOP_ALUNO	Computers used by students – Desktop computer
IN_COMP_PORTATIL_ALUNO	Computers used by students – Laptop computer
*IN_TABLET*_ALUNO	Computers used by students – Tablet
*IN_INTERNET*_ALUNOS	Internet access – For student use
*IN_INTERNET*_APRENDIZAGEM	Internet access – For use in teaching and learning processes
*IN_PROF*_BIBLIOTECÁRIO	Professionals working at the school – Librarian, library assistant, or reading room monitor
IN_PROF_COORDENADOR	Professionals working at the school – Shift/subject coordinator
IN_PROF_PEDAGOGIA	Professionals working at the school – Pedagogical support and supervision staff: pedagogue, pedagogical coordinator, educational advisor, school supervisor, and subject-area coordinator
IN_PROF_SEGURANÇA	Professionals working at the school – Security guard or property security staff

(R) = Reverse-coded.
Source: Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (2020).

Chart 1. Continued...

Variable	Description
IN_ALIMENTAÇÃO	School meals for students – National School Feeding Program (PNAE/FNDE)
IN_MATERIAL_PED_MULTIMIDIA	Sociocultural and/or pedagogical instruments and materials used in the school – Multimedia collection
IN_MATERIAL_PED_CIENTÍFICO	Sociocultural and/or pedagogical instruments and materials used in the school – Scientific materials set
IN_MATERIAL_PED_JOGOS	Sociocultural and/or pedagogical instruments and materials used in the school – Educational games
IN_MATERIAL_PED_NENHUM **(R)**	Sociocultural and/or pedagogical instruments and materials used in the school – None
IN_ÓRGAO_CONSELHO_ESCOLAR	Collegiate bodies operating in the school – School Council
IN_ÓRGAO_GRÊMIO_ESTUDANTIL	Collegiate bodies operating in the school – Student Council
IN_ORGAO_NENHUM **(R)**	Collegiate bodies operating in the school – No collegiate bodies operating
TP_PROPOSTA_PEDAGÓGICA	The school's pedagogical proposal or political-pedagogical project (according to Article 12 of the LDB) was updated in the last 12 months up to the reference date
TP_AEE	Specialized Educational Assistance (AEE)
IN_MEDIAÇÃO_PRESENCIAL	Didactic-pedagogical mediation offered by the school – In-person
IN_NOTURNO	Shift – Night shift – Most class activities take place between 6:00 p.m. and 5:59 a.m.

(R) = Reverse-coded.
Source: Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (2020).

to 85.6% in 2015 but increased again to 89.5% in 2016. In 2017, a reduction to 79.9% was observed, revealing fluctuations in the provision of these resources. In contrast, the availability of internet access in schools advanced: in 2017, 91.3% of institutions had internet access, with 79.9% having broadband connectivity. In 2018, the presence of computer laboratories and internet access remained high, with more than 60% of schools offering these resources. These data indicate a continuous effort to integrate technology into the school environment, although they also reveal challenges in maintaining adequate infrastructure across all institutions.

The Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (2020) released data on technological infrastructure accessible to students, teachers, and administrators in a period prior to the COVID-19 pandemic. Among the regions of Brazil, the Center-West stood out with 83.4% of elementary schools equipped with broadband internet. The Southeast and South regions followed with 81.2% and 78.7%, respectively, while the North and Northeast regions showed the lowest connectivity rates, with 31.4% and 54.7% of schools connected. For student use, the South region leads, with 65.4% of elementary schools offering this resource, followed by the Southeast with 51.8% and the Center-West with 48.3% (Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira, 2020).

The 2019 survey reveals that as students progress through educational levels, access to resources increases. According to the census, High Schools have more equipment than elementary schools. In the state school system, the main provider of High School education, 80.4% of schools have broadband internet and 79.3% offer desktop computers. It is important to note that in 2020 the census reference date was changed from May to March due to the pandemic and the suspension of in-person activities in most schools. Therefore, the results reflect the situation of schools before the health crisis, without considering its impact on education.

Chart 2. New structural and pedagogical attributes in education.

Domain	New Attributes	Justification
Access to Basic Services	IN_BANHEIRO	The presence of bathrooms in schools is a basic necessity. Their inclusion in the census is related to the growing focus on school infrastructure, recognizing the importance of these spaces for students' health and well-being.
Accessibility	IN_ACESSIBILIDADE_ INEXISTENTE	According to Kraemer and Thoma (2018), the Brazilian educational landscape has undergone a political reconfiguration over the last three decades, aiming to ensure adequate conditions for the development and learning of all students. In this context, the policy of school inclusion for students with disabilities has directed investments toward ensuring access, participation, and learning in regular schools. The inclusion of data on the lack of accessibility reflects this need.
Technology and Internet	IN_DESKTOP_ALUNO, IN_COMP_PORTATIL_ALUNO, IN_TABLET_ALUNO	The growing importance of technology in education highlights the need for information about the availability of computers and mobile devices for students, reflecting changes in pedagogical practices and in the integration of digital technologies into learning.
	IN_INTERNET_ALUNOS, IN_ INTERNET_APRENDIZAGEM	The inclusion of these attributes highlights the need to ensure access to connectivity for all students. This is essential for educational managers, researchers, and public policy makers, as it enables detailed diagnoses and the development of educational policies that meet the goals established by the Plano Nacional de Educação (PNE).
School Staff	IN_PROF_BIBLIOTECÁRIO, IN_PROF_COORDENADOR, IN_ PROF_PEDAGOGIA, IN_PROF_ SEGURANÇA	The presence of various professionals in schools indicates a more holistic and multidisciplinary approach to education, recognizing the importance of a diverse staff to provide educational support and ensure students' safety.
Pedagogical Materials	IN_MATERIAL_PED_ MULTIMIDIA, IN_MATERIAL_ PED_CIENTÍFICO, IN_ MATERIAL_PED_JOGOS, IN_MATERIAL_PED_NENHUM	These attributes reflect the diversity of pedagogical materials used in teaching and the need for detailed information about the resources available to support different teaching approaches.

Source: The authors.

The pandemic accelerated the need for technological integration at all educational levels, highlighting pre-existing inequalities and forcing a reassessment of public policies related to education (Magalhães, 2021). The transition to remote learning required rapid adaptations, ranging from real-time video lecture recordings to the production of educational programs for radio and television broadcasters (Magalhães, 2021). However, this adaptation to remote learning exposed the vulnerability of many schools, especially elementary schools, which were less prepared to face this change. Thus, the 2019 survey, although valuable, represents a scenario prior to the crisis, and current conditions may require new approaches to ensure equitable access to the technological tools necessary for students' education.

Therefore, starting in 2019, the School Census began to include data that provide a more comprehensive view of educational infrastructure, allowing public policies to be more targeted toward promoting digital inclusion and improving the quality of education. The information obtained makes it possible to monitor the country's educational development, identify trends and needs, and plan improvements in the educational system (Organização para a Cooperação e Desenvolvimento Econômico, 2024). This initiative was driven by the growing demand for connected education and the need to reduce inequalities in access to technology among different regions and levels of education.

The analysis of data from 2020 to 2023 shows continuous progress in the availability of technological resources in High Schools in Brazil, especially in the public school system. Over these years, there was a significant increase in the presence of internet access and equipment such as desktop and laptop computers, reflecting a consistent effort to integrate technology into the educational process. In 2022, the wide availability of internet access, with 95.6% of schools connected and more than 80% of public institutions offering computers, demonstrates an important advancement. However, challenges still remain, such as limited access to mobile devices (tablets) and digital whiteboards, which were present in only 17.8% and 29.3% of schools, respectively (*Statistical Notes Notebook*, Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira, 2021, 2022, 2023).

This evolution, although positive, highlights disparities that still exist between different levels of education and types of available equipment. The state school system, responsible for most High School enrollments, continues to lead in technological infrastructure but faces difficulties in ensuring that all students have equitable access to the tools necessary for a modern and inclusive education. In 2023, with 86.6% of state schools offering broadband internet and 79.5% using this connectivity for pedagogical purposes, it becomes evident that, although progress has been made, there is still room for improvement, especially regarding access to more advanced technologies and the training of education professionals in the use of these resources.

The relationship between infrastructure, technology, and student retention in High School emerges mainly through mediated pathways rather than immediate ones, involving students' cognitive processes and the organizational practices of schools (Yusuf et al., 2025). From a cognitive perspective, stable and well-integrated technological resources tend to increase cognitive and affective engagement, strengthen beliefs of self-efficacy and motivation, promote the development of metacognitive strategies, and reduce cognitive overload through more personalized learning trajectories, which together increase the likelihood of school continuation (Yusuf et al., 2025; Shannaq, 2025).

In organizational terms, the effectiveness of these resources depends on service quality, the institutional interface, teacher support, and the school climate, as well as monitoring and intervention systems based on data that identify students at risk (Chen et al., 2022; Salimon et al., 2021). Knowledge management (KM) therefore becomes the operational link by capturing and codifying evidence on engagement, self-efficacy, metacognition, and cognitive overload incidents, and by disseminating routines, indicators, and intervention protocols. In this way, KM enables infrastructure and tec-hnology to be transformed into concrete pedagogical and administrative actions that promote student retention (Cheng, 2015; Yusuf et al., 2025; Chen et al., 2022).

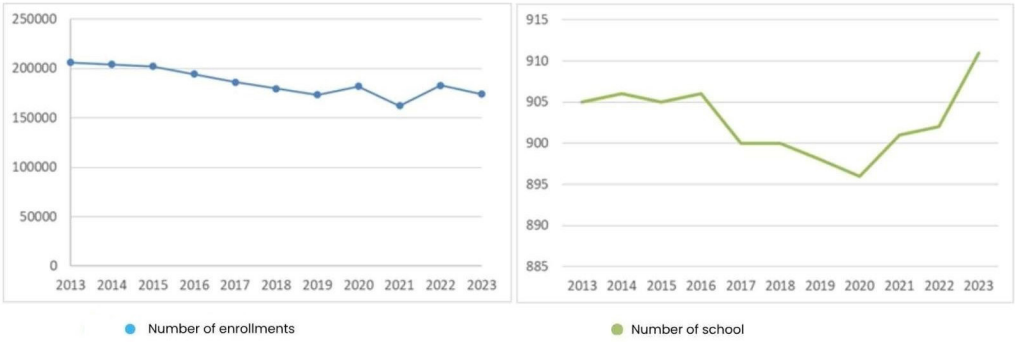

Figure 1. Number of High School enrollments and schools in Paraná, Brazil.
Source: The authors (2024).

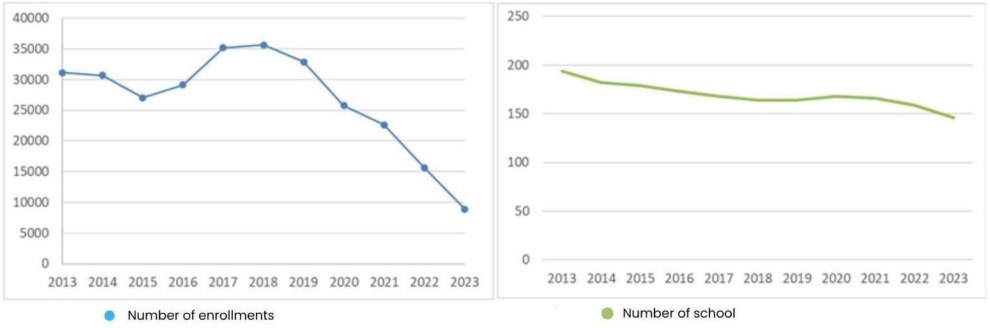

Figure 2. Number of Enrollments and EJA High School Institutions in the State of Paraná, Brazil.
Source: The authors (2024).

Additionally, a decline in the number of enrollments in High School in the state of Paraná was observed between 2013 and 2023 (Figure 1). In 2013, the total number of enrollments was around 200,000, but this number decreased consistently over the years, reaching approximately 150,000 in 2023. This reduction may be attributed to a decrease in student demand for High School, associated with factors such as declining birth rates and issues related to school dropout, intensified by the COVID-19 pandemic. Figure 2 shows a significant reduction in the number of enrollments in Youth and Adult Education (EJA) at the High School level in the state of Paraná, which decreased from 30,000 in 2013 to 10,000 in 2023. In addition, the graph on the right indicates that there was a reduction of 50 schools offering High School in the EJA modality, decreasing from 200 schools in 2013 to only 150 in 2023.

Regarding the number of enrollments in vocational schools, a significant decline is observed between 2013 and 2023 (Figure 3). In 2013, approximately 60,000 enrollments were recorded, while in 2023 this number fell to just over 40,000. Regarding the number of institutions, in 2013 there were around 220 schools. The largest reduction occurred in 2021, when the number of schools decreased to 200. However, between 2022 and 2023 there was a recovery, with the total reaching approximately 210 schools.

The correlation data by type of education can be seen in Chart 3.

In Elementary Education, the observed correlation was 0.475695, considered moderate and positive. This suggests that better school infrastructure is associated with better results or educational indicators at this level of education. The high Student's t value (43.17959) reinforces the statistical significance of this correlation, highlighting the relevance of structural elements for student performance. Therefore, the physical educational environment, which includes aspects such as material resources and facility conditions, may have a significant impact on academic performance.

On the other hand, in High School, the moderate and positive correlation of 0.550757 indicates an even stronger association between school infrastructure and educational outcomes compared

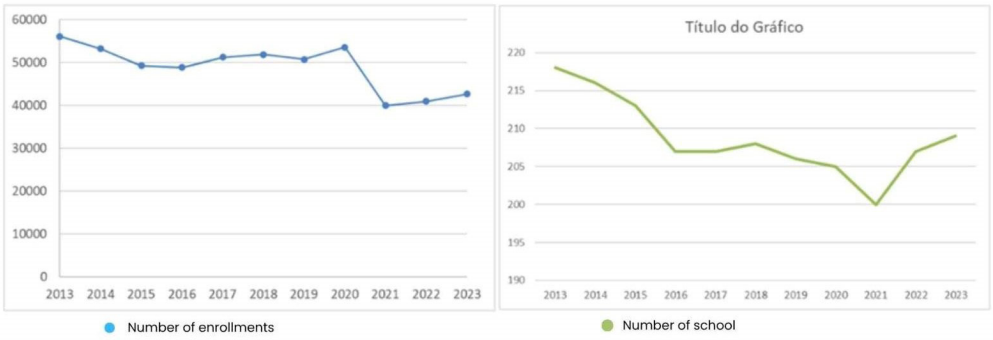

Figure 3. Number of Enrollments and Vocational Technical schools in the state of Paraná, Brazil. **Source:** The authors (2024).

Chart 3. Correlation data by type of education.

Types of Education	Correlation	N. of Observations	T *Student*
Elementary Education	0,475695	6377	43,17959
High School	0,550757	4508	44,29387
Vocational Education	0,073847	1028	2,371898
Technical Education	0,071964	1027	2,31
Youth and Adult Education – Elementary Level	-0,99615	3640	2,859245
Youth and Adult Education – High School Level	-0,31977	803	-9,55152

Source: The authors (2024).

to Elementary Education. The high Student's t value (44.29387) reinforces the importance of adequate structural conditions at this educational level, demonstrating that improvements in the physical conditions of schools play a fundamental role in reducing educational inequalities.

In contrast, in Vocational Education and Technical Education, low and positive correlations were observed (0.073847 and 0.071964, respectively), suggesting that the structural elements of schools have little or no relationship with the indicators analyzed. The Student's t values for Vocational Education (2.371898) and Technical Education (2.31) are also low, indicating that these correlations may not be statistically significant.

Regarding Youth and Adult Education (EJA), the data indicate a very high and negative correlation in Elementary-level EJA (-0.99615). This strongly negative correlation suggests that deficient school infrastructure is associated with worse educational outcomes at this level. The Student's t value (2.859245) suggests that this correlation is statistically significant, although the negative sign requires careful analysis to understand the causes of this inversion.

Furthermore, the moderate and negative correlation (-0.31977) observed in High School-level EJA points to a possible association between inadequate infrastructure and poorer educational outcomes.

The Student's t value (-9.55152) indicates statistical significance, reflecting the negative impacts of precarious structural conditions on the performance of adult students, who often face additional challenges outside the school environment, such as family and work responsibilities. These results suggest the need for further investigation to better understand the underlying factors influencing this relationship and how to improve learning conditions for this population.

School infrastructure, which includes facilities, equipment, and services necessary for the functioning of schools and for supporting learning, is a fundamental element for student performance (Vasconcelos et al., 2021). The existence of adequate and updated physical

infrastructure facilitates the adoption of innovative teaching methods, encourages students' creativity and autonomy, and increases their engagement in the educational process. This combination of factors creates an environment that promotes inclusion and supports the assimilation of new knowledge and skills (Gomes et al., 2023).

Furthermore, school infrastructure directly affects the capacity of institutions to integrate educational technologies. In situations of precarious infrastructure, the lack of electricity or internet access can restrict the use of technologies, affecting students' motivation and permanence in school. Technological resources play an increasingly significant role in contemporary education. According to Lima and Araújo (2021), the inclusion of technologies in teaching and learning promotes new methodologies and diversifies forms of learning. However, the effectiveness of these technologies depends on the available infrastructure and the training of educators. In institutions with limited resources, the adoption of technologies can be challenging, intensifying regional and socioeconomic inequalities.

Technology, when used appropriately, can enrich the learning experience and increase students' motivation by enabling content to be presented in multiple ways and facilitating collaborative learning and group research. However, challenges also arise, such as students' tendency toward distraction and the need for constant teacher attention to maintain focus. Moreover, if not used properly, technology can perpetuate outdated pedagogical methods (Pereira; Araújo, 2020). To overcome these difficulties, it is essential to prioritize the training of educators, ensuring that they are prepared to use technologies effectively in the teaching and learning process.

In addition to technological resources, the management of school infrastructure and knowledge management (KM) can be valuable tools in combating school dropout. KM integrates strategic approaches to identify, prevent, and mitigate factors that lead students to abandon their studies. Monitoring and data analysis are essential for detecting patterns and risk factors associated with school dropout. According to Alavi e Leidner (2001), this analysis is fundamental for building organizational knowledge and enables the implementation of evidence-based interventions.

Early interventions, such as personalized tutoring and pedagogical and emotional support, are vital to keep students at risk of dropping out in school. Davenport and Prusak (1998) emphasize the importance of transferring tacit knowledge, including emotional and academic support. Community engagement is equally essential; involving parents, guardians, and community members in the educational process can create a welcoming and inclusive school environment. Nonaka and Takeuchi (1997) highlight that knowledge sharing can be an effective means of preventing school dropout.

Integrating the teaching of socioemotional skills into the curriculum helps students develop resilience, self-esteem, and problem-solving abilities, strengthening their connection with the school. Peter Senge (2017) points out that team learning develops group competencies that enhance individuals' capacity to engage in genuine collaborative thinking. Students who feel connected with peers, teachers, and the school staff are more likely to remain in school and complete High School.

The use of educational technology should aim to make learning more engaging, accessible, and personalized, addressing the individual needs of students. According to Rodrigues (2019), schools should use technological resources to facilitate the sharing of information between teachers and students, forming the KM triad composed of people, processes, and technology. According to Davenport and Prusak (1998), this triad is fundamental for promoting the generation, dissemination, and application of knowledge, with technology acting as a facilitator in this process.

Given these findings, the estimated coefficients can be transformed into knowledge management routines through operational strategies (Maia; Bueno; Sato, 2021). Among the main operational strategies is the transformation of these correlation magnitudes into central Key Performance Indicators (KPIs) that reflect inputs, processes, and outcomes, such as the number of computers per student, the percentage of teachers with higher education degrees, attendance rates, and dropout rates, adopting weights proportional to the estimated importance of the predictors (Schildkamp, 2019). Another important

strategy is to derive decision rules that establish thresholds for high, medium, and low risk based on empirical distributions and to create a School Vulnerability Index composed of weights according to the observed elasticities (Fernández et al., 2025; Croitoru et al., 2025). Additionally, management dashboards can be operationalized to present goals, current status, trends, and alerts for each indicator, enabling staged interventions and review cycles (Sälzer; Ricking; Feldhaus, 2024). These measures translate what the coefficients indicate as most relevant into practical priorities for managers and make the role of KM concrete by ensuring systematic data collection, transparent codification, information circulation, and the application of intervention protocols based on the empirical evidence presented (Maia; Bueno; Sato, 2021).

Finally, it is essential to consider the impact of the COVID-19 pandemic on the use of technologies and on school infrastructure. The pandemic intensified preexisting inequalities and changed how technologies are applied in remote and hybrid learning. Continuous evaluation of technological initiatives and KM strategies is essential to ensure that they meet students' needs and help reduce school dropout. Adapting approaches to the specificities of each educational context may contribute to reducing dropout and supporting the teaching and learning process.

FINAL CONSIDERATIONS

The results show that High School dropout is consistently associated with the structural and technological conditions of schools, indicating that student retention does not depend solely on individual factors but also on institutional capacities that support the teaching and learning process. In light of Knowledge Management (KM), these findings reinforce the importance of structuring systems for data collection, analysis, and use that transform information from the School Census and educational indicators into effective support for decision-making. In this sense, KM is not limited to organizing data but also involves institutionalizing monitoring routines, sharing evidence, and continuously evaluating results, thereby strengthening the capacity of education systems to identify vulnerabilities and prioritize interventions.

Moreover, the findings align with recent policies aimed at improving retention in High School by indicating that investments in infrastructure, connectivity, and pedagogical support tend to produce more consistent effects when accompanied by monitoring and evaluation mechanisms based on evidence.

Intersectoral coordination also proves to be strategic, particularly when considering the requirement of school enrollment and attendance in income transfer programs, which establish educational conditionalities as an instrument of social protection. The integration between educational policies and social assistance policies expands the potential to address school dropout by combining incentives for school retention with improvements in the structural and pedagogical conditions of schools.

Furthermore, teacher training and psychopedagogical support are fundamental for creating conditions that encourage students to remain in school. Community involvement and the promotion of continuous dialogue between schools, families, and civil society are equally crucial to strengthen students' commitment to their education. Therefore, to reverse the trend of school dropout and improve the quality of education, it is imperative that educational policies be implemented in a systematic and integrated manner. Only in this way will it be possible to ensure that young people remain in school and complete their education, contributing to the transformation of their lives and their communities. The construction of a stronger and more promising educational future depends on the joint action of all stakeholders, creating a virtuous cycle of learning and social development.

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Authors contribution

TTRA: Conceptualization (study conception; formulation of research questions and objectives), Methodology (methodological design of the research), Statistical analysis (execution of the statistical design), Writing - original draft (writing of the original manuscript). LFDF: Funding acquisition (securing financial resources), Project administration (guidance, supervision, or coordination), Resources (provision of materials, equipment, and software), Software (programming and software development; design of computer programs; implementation of code and supporting algorithms; testing of existing code components), Review (critical revision of the original manuscript and approval of the version to be submitted). TMT: Data curation (management of data and metadata; maintenance of data for initial and subsequent use), Data collection (conducting experiments and implementing data-collection procedures, such as forms/interviews), Validation (responsibility for assessing the reproducibility of the research). ASS: Data analysis (interpretation of results and attribution of meaning based on predetermined theoretical frameworks), Funding acquisition (securing financial resources), Visual preparation of data (visual organization; preparation of tables, charts, and other graphical elements).

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