

Data Report on School Dropout in a Brazilian State: Social Technologies for Preventing the Phenomenon.

Leogildo Alves Freires^a, Heitor Marinho da Silva Araújo^b, Luan Filipy Freire Torres^c, Thiago Damasceno Cordeiro^d, Gabriel Fortes Cavalcanti de Macedo^e

^a Psychology Institute, Federal University of Alagoas, Maceió, Brazil, leogildo.freires@nees.ufal.br, 0000-0001-5149-2648.

^b Psychology Institute, Federal University of Bahia, Salvador, Brazil, heitormrnh@gmail.com, 0000-0001-7245-9679.

^c Psychology Department, Federal University of Pernambuco, Recife, Brazil, luan.ftorres@ufpe.br, 0000-0001-5820-2367.

^d Psychology Institute, Federal University of Alagoas, Maceió, Brazil, thiago.cordeiro@nees.ufal.br, 0000-0003-0976-7040.

^e Facultad de Psicología, Universidad Alberto Hurtado, Santiago, Chile, gabriel.macedo@nees.ufal.br, 0000-0003-4997-0019.

Submitted: 31 January 2025, Revised: 26 March 2025, Accepted: 21 April 2025, Published: 30 June 2025

Abstract. School dropout is a multifaceted and persistent challenge with serious implications for public health, economic development, and social equity. In Brazil, where educational disparities remain deeply rooted in structural and contextual inequalities, addressing dropout requires more than tracking attendance, academic performance, or behavior. This study presents the development and implementation of a Relational Model (RM) aimed at identifying and mitigating school dropout risks through a comprehensive, data-informed approach. Central to this model is the Alternative Instrument for Assessing School Dropout Risk Factors (IAFREE-A), which evaluates 13 interrelated risk factors across five key dimensions: Student-School, Student-School Professionals, Student-Family, Student-Community, and Student-Student. These dimensions allow for a nuanced understanding of how relational dynamics and contextual conditions shape students' engagement with schooling. A pilot study was carried out in the state of Mato Grosso, involving 624 students across 10 public schools. Data collection was conducted through physical questionnaires, digitized using Optical Character Recognition (OCR) technology, and processed via an integrated digital platform. This platform generates individual and institutional dropout risk profiles by mapping protective and risk factors, providing actionable insights for educators, school administrators, and policymakers. Results highlighted critical concerns such as inadequate school infrastructure, perceptions of insecurity, and weak family-school connections, reinforcing the need for early, context-specific interventions. The findings demonstrate that school dropout is not an isolated event, but the outcome of complex relational, institutional, and structural factors. The RM and IAFREE-A offer an innovative and culturally sensitive framework for prevention, enabling tailored interventions that respond to students' lived realities. By fostering stronger connections among students, educators, families, and communities, this approach has the potential to reduce dropout rates and promote more equitable and supportive educational environments in Brazil and beyond.

Keywords. School Dropout Prevention, Relational Model (RM), Early Warning Systems (EWS)
Poster, DOI: <https://doi.org/10.59490/dgo.2025.1053>

1. Introduction

School dropout, defined as the cessation of school attendance without re-enrolment in the formal education system, is widely recognised as both a public health concern and an economic issue, with profound implications for unemployment, poverty, crime rates, and mental health (Wood et al., 2017; Vinas-Forcade et al., 2021). The phenomenon is driven by a complex interplay of individual, familial, school-related, and community factors, including poor academic performance, lack of motivation, emotional challenges, adverse socioeconomic conditions, and insufficient family support (Witte et al., 2013; Nelson et al., 2016). These factors collectively contribute to a multifaceted problem that requires a comprehensive and nuanced approach to address effectively. To tackle this issue, a Relational Model (RM) has been proposed, which integrates protective dimensions and early warning indicators for school dropout. This model employs an Alternative Instrument for Assessing School Dropout Risk Factors (IAFREE-A), comprising 13 risk factors categorised into five dimensions: Student-School, Student-School Professionals, Student-Family, Student-Community, and Student-Student (Vasconcelos et al., 2023). The model offers a holistic perspective on the interactions influencing dropout, moving beyond conventional metrics such as attendance, behaviour, and academic performance, which, while important, do not fully capture the relational and contextual dynamics that contribute to dropout (Kearney, 2021).

The Student-School dimension focuses on the relationship between the student and the school environment, including factors such as infrastructure, safety, and the availability of educational resources. Poor infrastructure, for example, can create an unwelcoming and unsafe environment, discouraging attendance and engagement. Schools with inadequate facilities, such as lack of proper classrooms, libraries, or even basic sanitation, can significantly impact students' willingness to attend and engage in learning (Churchill et al., 2021). Additionally, the perception of safety within the school environment plays a critical role. Students who feel unsafe due to bullying, violence, or lack of supervision are more likely to disengage and eventually drop out (Vinas-Forcade et al., 2021). The Student-School Professionals dimension examines the interactions between students and school staff, including teachers, administrators, and support personnel. Positive relationships with school professionals can foster a sense of belonging and support, while negative interactions can lead to disengagement and dropout (Uekawa et al., 2010; King & Garcia, 2016). Teachers who are empathetic, approachable, and supportive can create an environment where students feel valued and motivated to succeed. Conversely, a lack of communication or negative interactions with school staff can alienate students, making them feel disconnected from the educational process (Rogers & Feller, 2016).

The Student-Family dimension considers the role of family support in a student's educational journey. A lack of parental involvement or unstable family environments can significantly impact a student's ability to remain in school (Witte et al., 2013). Families facing financial difficulties may prioritise work over education, leading students to drop out to contribute to household income. Similarly, households with high levels of conflict, neglect, or abuse can create an environment where education is not prioritised or supported. On the other hand, families that actively engage in their children's education, by attending school meetings, helping with homework, or simply showing interest in their academic progress, can significantly enhance students' motivation and commitment to staying in school (Rogers & Feller, 2016). The Student-Community dimension explores the influence of the broader community, including socioeconomic conditions, access to extracurricular activities, and community attitudes towards education. In communities where education is undervalued or where economic opportunities are limited, students may see little incentive to remain in school (Churchill et al., 2021). Conversely, communities that prioritise education and provide resources such as after-school programmes, mentorship opportunities, and safe spaces for learning can create a supportive environment that encourages students to stay in school (Vinas-Forcade et al., 2021). Finally, the Student-Student dimension looks at peer relationships and the social dynamics within the school environment, which can either support or hinder a student's educational trajectory. Positive peer relationships can provide emotional support and motivation, while negative interactions, such as bullying or social exclusion, can lead to disengagement and dropout (Nelson et al., 2016).

2. Research methods

To test the effectiveness of this model, a pilot study was conducted in a Brazilian state in partnership with the local education secretaries, involving data collection from 624 students across 10 schools. Physical questionnaires were used, which were subsequently digitised using Optical Character Recognition (OCR) technology and processed on an integrated platform. This platform generates scores that map protective dimensions and dropout risk factors, enabling data-driven decision-making. The pilot results underscored the instrument's efficacy in the early identification of at-risk students, highlighting critical issues such as inadequate school infrastructure, the perception of schools as unsafe environments, and a lack of family support (Vasconcelos et al., 2023). These findings reinforce the necessity of considering contextual and relational factors in dropout prevention strategies, as traditional metrics alone are insufficient to capture the full scope of the problem (Wood et al., 2017; Kearney, 2021).

3. Results

The study concludes that school dropout should be understood as a multifactorial and relational process, shaped by a combination of structural, institutional, and subjective elements. Structural factors include socioeconomic conditions, access to resources, and community support, while institutional factors encompass school policies, teacher-student relationships, and the overall school climate (Fuentes, 2024). Subjective factors, on the other hand, involve individual experiences, perceptions, and emotional states, which can significantly influence a student's decision to leave school (Nelson et al., 2016). The concept of protecting educational trajectories, central to this study, extends beyond merely identifying imminent risks. Instead, it focuses on creating conditions that foster student retention and academic achievement. This approach is rooted in the understanding that enhancing positive interactions among the various stakeholders in the educational ecosystem can transform schools into environments of opportunity (Fuentes, 2024).

The Relational Model (RM) and the IAFREE-A instrument represent a significant advancement in the field of dropout prevention. By integrating multiple dimensions and focusing on relational dynamics, the model provides a more comprehensive framework for understanding and addressing the root causes of dropout (Vasconcelos et al., 2023). The pilot study demonstrated the practical applicability of this model, showing that it can effectively identify at-risk students and provide actionable insights for intervention. The integrated platform, which processes and visualises the data collected through the IAFREE-A instrument, plays a crucial role in this process. It allows educators, administrators, and policymakers to access detailed information about the factors contributing to dropout risk, enabling them to tailor interventions to the specific needs of their students and schools (Vasconcelos et al., 2023).

One of the key strengths of the model is its emphasis on early intervention. By identifying at-risk students before they disengage from school, educators can implement targeted support measures that address the underlying issues contributing to dropout. This proactive approach is far more effective than reactive measures, which often come too late to make a meaningful difference (Barfield et al., 2012). The pilot study highlighted several areas where early intervention could have a significant impact, including improving school infrastructure, fostering positive relationships between students and school staff, and increasing family involvement in education. These interventions, when implemented effectively, can create a supportive and engaging school environment that encourages students to stay in school and achieve their academic potential (Perusia & Cardini, 2021).

The study also underscores the importance of evidence-based public policies in addressing school dropout. By monitoring the long-term impact of interventions and continuously refining strategies based on data, policymakers can ensure that their efforts are effective and sustainable (Fuentes, 2024). The integrated platform developed as part of this research provides a valuable tool for this purpose, offering a detailed and accessible overview of dropout risk factors and protective dimensions. This platform can be used by a wide range of stakeholders, from school administrators to national policymakers, to inform their decision-making and prioritise resources where they are needed most (Vasconcelos et al., 2023).

In addition to its practical applications, the study makes a significant theoretical contribution to the field of education. By proposing a relational model that integrates multiple dimensions of dropout risk, it challenges traditional approaches that focus narrowly on academic performance and attendance (Kearney, 2021). This broader perspective aligns with contemporary research, which increasingly recognises the importance of relational and contextual factors in shaping educational outcomes (Wood et al., 2017). The study also highlights the need for culturally sensitive and context-specific approaches to dropout prevention, as the factors contributing to dropout can vary significantly across different regions and communities (Gutiérrez-de-Rozas et al., 2022).

The Relational Model (RM) and the IAFREE-A instrument are particularly relevant in the context of Brazil, where school dropout rates remain a persistent challenge. The country's diverse socioeconomic and cultural landscape requires tailored solutions that address the unique needs of different communities (Fuentes, 2024). The pilot study conducted in the federal state of Mato Grosso demonstrated the potential of this approach to make a meaningful impact in a Brazilian context. By identifying the specific factors contributing to dropout in this region, the study provides a foundation for developing targeted interventions that can be scaled up and adapted to other parts of the country (Vasconcelos et al., 2023).

4. Conclusion

In conclusion, the study presents a robust and innovative approach to addressing the complex issue of school dropout with some limitations as being a pilot study. By integrating multiple dimensions of dropout risk and focusing on relational dynamics, the Relational Model (RM) provides a comprehensive framework for understanding and addressing the root causes of dropout. The IAFREE-A instrument and the integrated platform offer practical tools for identifying at-risk students and implementing targeted interventions. The study demonstrated the effectiveness of this approach in a Brazilian context, highlighting its potential to make a

meaningful impact on dropout rates and educational outcomes. The study also underscores the importance of evidence-based public policies and the need for culturally sensitive, context-specific solutions. By continuing to refine and expand this approach, it is possible to create a more equitable and inclusive education system that supports all students in achieving their full potential.

Acknowledgement

We thank the University Foundation for Extension Development and Research (Fundepes) for funding the project.

Contributor Statement

All authors have corroborated in the Conceptualization, Formal analysis, Investigation, Methodology, Resources, Writing - Original Draft and Writing - Review & Editing

References

- Barfield, K. A., Hartman, J., & Knight, D. ([s.d.]). Early warning systems: It's never too early. *T. H. E. Journal*, 39(2), 18–19.
- De Vasconcelos, A. N., Freires, L. A., Loureto, G. D. L., Fortes, G., Da Costa, J. C. A., Torres, L. F. F., Bittencourt, I. I., Cordeiro, T. D., & Isotani, S. (2023). Advancing school dropout early warning systems: The IAFREE relational model for identifying at-risk students. *Frontiers in Psychology*, 14, 1189283. <https://doi.org/10.3389/fpsyg.2023.1189283>
- De Witte, K., Cabus, S., Thyssen, G., Groot, W., & Van Den Brink, H. M. (2013). A critical review of the literature on school dropout. *Educational Research Review*, 10, 13–28. <https://doi.org/10.1016/j.edurev.2013.05.002>
- Examining the Relationship Between Persistence in Attendance in an Afterschool Program and an Early Warning Index for Dropout—UNT Digital Library*. ([s.d.]). Recuperado 21 de março de 2025, de <https://digital.library.unt.edu/ark:/67531/metadc500218/>
- Gutiérrez-de-Rozas, B., López-Martín, E., & Carpintero Molina, E. (2022). Condicionantes del rendimiento académico: Revisión sistemática de 25 años de meta-análisis. *Revista de Educación*, 398, 1–48. <https://doi.org/10.4438/1988-592X-RE-2022-398-552>
- Improving Education Participation*. ([s.d.]).
- Kearney, C. A. (2021). Integrating Systemic and Analytic Approaches to School Attendance Problems: Synergistic Frameworks for Research and Policy Directions. *Child & Youth Care Forum*, 50(4), 701–742. <https://doi.org/10.1007/s10566-020-09591-0>
- Nelson, N. J., & Baker, S. K. (2016). *Researcher-Practitioner Partnerships*:

Pesquisas sobre políticas de proteção das trajetórias: Educação secundária na América Latina; sumário executivo—UNESCO Digital Library. ([s.d.]). Recuperado 21 de março de 2025, de

https://unesdoc.unesco.org/ark:/48223/pf0000390702_por

Rogers, M., Churchill, E., & Pristawa, K. (2021). "High schoolers' and middle schoolers' connections in their schools: Relation to tardiness, absences, disciplinary referrals, and failed courses". *National Youth at Risk Journal*, 4(2). <https://doi.org/10.20429/nyarj.2021.040203>

Rogers, T., & Feller, A. (2016). *Parent Beliefs and Student Absences: Large Absence-Reduction Field Experiment*. Society for Research on Educational Effectiveness. <https://eric.ed.gov/?id=ED567510>

Sistemas de alerta temprana en la educación secundaria: Prevenir el abandono escolar en la era del COVID-19. ([s.d.]). Recuperado 21 de março de 2025, de

<https://www.cippec.org/publicacion/sistemas-de-alerta-temprana-en-el-nivel-secundario/>

Uekawa, K., Merola, S., Fernandez, F., & Porowski, A. (2010). *Creating an Early Warning System: Predictors of Dropout in Delaware. REL Mid-Atlantic Technical Assistance Brief. REL MA 1.2.75-10*. Regional Educational Laboratory Mid-Atlantic. <https://eric.ed.gov/?id=ED565682>

Vinas-Forcade, J., Mels, C., Van Houtte, M., Valcke, M., & Derluyn, I. (2021). Can failure be prevented? Using longitudinal data to identify at-risk students upon entering secondary school. *British Educational Research Journal*, 47(1), 205–225. <https://doi.org/10.1002/berj.3683>

Wood, L., Kiperman, S., Esch, R. C., Leroux, A. J., & Truscott, S. D. (2017). Predicting dropout using student- and school-level factors: An ecological perspective. *School Psychology Quarterly*, 32(1), 35–49. <https://doi.org/10.1037/spq0000152>