

University Student Dropout in Colombia: A Typology of Barriers, Institutional Shared Responsibility, and a Conceptual Model of “Soulless Education” as a Public Policy Challenge

“Deserción estudiantil universitaria en Colombia: tipología de barreras, corresponsabilidad institucional y un modelo conceptual de “educación sin alma” como desafío de política pública”

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Abstract

Student dropout in higher education in Colombia is best understood as a multicausal and multilevel phenomenon, in which socioeconomic, academic, institutional, and personal determinants converge, with territorial and institutional variations. In this regard, the systematic literature review reflected in this working paper on the phenomenon of student dropout in undergraduate academic programs identifies a broad set of studied causes and solutions and underscores the need to integrate actors and approaches so that strategies do not remain fragmented (Arias et al., 2024). At the structural level, multilevel evidence shows that regional and institutional inequalities are associated with dropout and that the phenomenon is not distributed homogeneously across institutions and fields of study (Barbosa-Camargo et al., 2021). In virtual education, the Colombian literature reports barriers particularly associated with geographic location (rurality), work and family obligations, and socioeconomic conditions (Guzmán Rincón et al., 2021), as well as specific risk factors for vulnerable groups in virtual higher education (Segovia-García et al., 2024).

This working paper proposes an operational and reusable typology for diagnosing and managing student persistence based on the analysis of four barriers or constraints: money, time, program–student fit, and personal factors. Its contribution does not lie in “inventing” new causes, but rather in organizing the evidence so that it becomes actionable and measurable. In particular, the typology is strengthened by findings on inequality and socioeconomic conditions (Barbosa-Camargo et al., 2021); patterns of participation and learning behavior as early signals of risk (Huang et al., 2023); institutional support and the use of student support services (Johnson et al., 2022); relational dimensions such as instructor care and engagement (Okwuduba et al., 2022); and learning analytics and data science approaches for early warning detection, explainability, and targeted interventions (Olaya et al., 2020; Mustofa et al., 2025; Vaarma & Li, 2024; Seo et al., 2024; Rabelo & Zárate, 2024). In addition, the paper retains the notion of “soulless education” as a critical metaphor and proposes its translation into observable dimensions (support, academic-social integration, relevance/fit, material support, and theory–practice linkage) through an agenda for empirical operationalization based on the analyzed corpus (De-Juan-Vigaray et al., 2024; Barbeau et al., 2025; Belando-Montoro et al., 2022).

Keywords

Learning Analytics; Socioeconomic Barriers; University Dropout; Virtual Education; Student Persistence; Educational Policy.

Resumen

La deserción en la educación superior en Colombia se comprende mejor como un fenómeno multicausal y multinivel, donde se combinan determinantes socioeconómicos, académicos, institucionales y personales, con variaciones territoriales e institucionales. De este modo, la revisión sistemática de literatura reflejada en este documento de trabajo sobre el fenómeno de la deserción estudiantil en los programas académicos de pregrado identifica un conjunto amplio de causas y soluciones estudiadas, y subraya la necesidad de integrar actores y enfoques para que las estrategias no queden fragmentadas (Arias et al., 2024). A nivel estructural, la evidencia multinivel muestra que las desigualdades regionales e institucionales se asocian con el abandono y que el fenómeno no se distribuye homogéneamente entre instituciones y campos de estudio (Barbosa-Camargo et al., 2021). En modalidad virtual, la literatura colombiana reporta barreras especialmente asociadas a la zona geográfica (ruralidad), obligaciones laborales y familiares, y condiciones socioeconómicas (Guzmán Rincón et al., 2021), así como factores de riesgo específicos para grupos vulnerables en educación superior virtual (Segovia-García et al., 2024).

Este working paper propone una tipología operativa y reutilizable para el diagnóstico y gestión de permanencia estudiantil basada en el análisis de cuatro barreras o limitantes: dinero, tiempo, programa–persona y personal. La contribución no consiste en “inventar” nuevas causas, sino en organizar la evidencia para que sea accionable y medible. En particular, se robustece la tipología con hallazgos sobre: inequidad y condiciones socioeconómicas (Barbosa-Camargo et al., 2021); patrones de participación y conducta de aprendizaje como señales tempranas de riesgo (Huang et al., 2023); apoyo institucional y uso de servicios estudiantiles (Johnson et al., 2022); dimensiones relacionales como cuidado docente y engagement (Okwuduba et al., 2022); y enfoques de analítica educativa y ciencia de datos para detección de alerta temprana, explicabilidad y focalización de intervenciones (Olaya et al., 2020; Mustofa et al., 2025; Vaarma & Li, 2024; Seo et al., 2024; Rabelo & Zárate, 2024). Además, el documento conserva la noción de “educación sin alma” como metáfora crítica y propone su traducción a dimensiones observables (acompañamiento, integración académico-social, pertinencia/ajuste, soporte material y vínculo teoría–práctica) mediante una agenda de operacionalización empírica basada en el corpus analizado (De-Juan-Vigaray et al., 2024; Barbeau et al., 2025; Belando-Montoro et al., 2022).

Palabras Clave

Analítica Educativa; Barreras Socioeconómicas; Deserción Universitaria; Educación Virtual; Permanencia Estudiantil; Política Educativa.

Introduction

University dropout continues to be a central concern for higher education institutions, students, and public policy, as it entails the analysis of both exogenous and endogenous factors, including personal costs (interruption of life trajectories), institutional costs (loss of students and reduced efficiency), and social costs (inequality of opportunity). In Colombia, the evidence shows that this phenomenon is multicausal and that student persistence strategies require interinstitutional coordination and conceptual clarity. For example, the systematic review by Arias et al. (2024) not only organizes causes and solutions, but also highlights the lack of integration among stakeholders as a barrier to cross-cutting solutions. At the structural level, the multilevel analysis by Barbosa-Camargo et al. (2021) shows that regional and institutional inequality matters: dropout is not uniform and depends on interactions among contexts, institutions, and fields of study.

In the virtual modality—critical in Colombia because of its coverage potential—the literature identifies specific risks. In virtual programs with rural students, dropout is associated with work and family obligations, as well as socioeconomic conditions, making clear that “attending” or “being enrolled” does not guarantee being able to sustain the educational process (Guzmán Rincón et al., 2021). In addition, in virtual higher education for vulnerable groups, the literature describes dropout reasons rooted in economic factors, as well as technological accessibility and service conditions that may escalate risk (Segovia-García et al., 2024). At the institutional level, data-based studies show that academic, social, and individual variables make it possible to profile risk and design locally relevant strategies (Falla & Vargas-Cañas, 2024), while studies on academic performance suggest that the analysis of trajectory-related variables (for example, course repetition or cancellations) can be considered early warnings or signals for targeting support (Gutiérrez-Monsalve et al., 2021).

At the same time, recent international literature provides useful tools for making student persistence management actionable, especially when pedagogical and organizational evidence is combined with learning analytics. For example, the

use and quality of student support services have been studied as part of the student persistence ecosystem (Johnson et al., 2022), while relational dimensions such as instructor care and engagement have been associated with educational trajectories and learning dispositions (Okwuduba et al., 2022).

Likewise, studies on dropout in online environments (for example, MOOCs) group determinants into categories that facilitate intervention design, such as course attributes, social status, cognitive capacity, emotional factors, and learning behavior (Huang et al., 2023). These categories can enter into dialogue with more “human” institutional typologies—such as money, time, program, and personal reasons—without reducing the phenomenon to a single level.

This working paper also introduces an integrative notion: “soulless education.” Here, it is understood as a critical metaphor that names a deficit in formative meaning, pedagogical connection, and genuine support, which may be expressed through observable signals (academic adjustment, satisfaction, integration, support, and student well-being). The literature makes it possible to operationalize parts of that metaphor through measurable constructs, such as satisfaction and “hygienic/motivational” factors in the university environment (De-Juan-Vigaray et al., 2024), perceptions of assessment and academic adjustment (Barbeau et al., 2025), inclusion and barriers/facilitators among disadvantaged students (Belando-Montoro et al., 2022), mental health (Del Savio et al., 2022), and self-regulation and/or procrastination linked to dropout intention (Delgado-García et al., 2025).

Methodology

This working paper is based on a conceptual–analytical (non-empirical) methodology grounded in a directed synthesis of the evidence contained in the attached articles. Accordingly, it corresponds to a qualitative research approach (Hernández Sampieri et al., 2023) grounded in a systematic literature review (SLR), which, according to Vilá and Gómez (2025), may constitute an effective methodology that enables researchers to delimit the research

question and collect data and information from secondary sources related to articles and publications indexed in databases such as Scopus, Web of Science, DOAJ, among others.

Accordingly, the procedure applied under the SLR methodology is outlined below:

- 1). Operational typology coding: Findings were organized into four barriers or exclusion criteria (money, time, program–student fit, and personal factors), ensuring traceability through APA 7th edition citations to the studies supporting the underlying mechanisms and variables.
- 2). Multilevel mapping: Macro-determinants (inequality, financing policies), meso-determinants (institutional capacity: teaching, services, infrastructure, management), and micro-determinants (student conditions, learning behavior, well-being, and self-regulation) were distinguished on the basis of cases reported in Colombia and comparable studies (Arias et al., 2024; Barbosa-Camargo et al., 2021; Segovia-García et al., 2024; Guzmán Rincón et al., 2021).
- 3). Translation into observable variables: Measurable indicators were identified in institutional records (for example, academic trajectories and LMS interaction), surveys (satisfaction, adjustment, and perceptions of assessment), and service-related evidence (use and impact), following profiling approaches and instruments co-designed with educational stakeholders (Llauró et al., 2023), as well as studies in learning analytics (Vaarma & Li, 2024; Seo et al., 2024).
- 4). Analytical layer for intervention: Predictive and intervention-design approaches were integrated, clearly differentiating among: (a) predictive models (risk), (b) explainable models (why), and (c) models oriented toward intervention impact (whom to intervene with in order to maximize effect), based on the ML/XAI and uplift modeling literature (Mustofa et al., 2025; Rabelo & Zárate, 2024; Vaarma & Li, 2024; Seo et al., 2024; Olaya et al., 2020).

In this way, the text preserves the distinction between correlation and causality, insofar as most of the studies cited here provide associations and predictive models; causal claims are formulated as propositions for subsequent validation.

Results

The results obtained through the application of the SLR (Systematic Literature Review) methodology are presented below.

1). Operational typology of barriers and mechanisms

The synthesis suggests that student dropout can be managed more effectively when the operational barriers that connect diagnosis with intervention are identified, without losing sight of its multilevel complexity.

Barrier 1: Money (material constraint and inequality).

Colombian evidence indicates that regional and institutional inequality is associated with dropout, which makes it necessary to consider financing policies and territorial equity as part of the problem (Barbosa-Camargo et al., 2021). However, public institutions are shown to align their processes with the funding allocated by the state; therefore, the resources assigned to each institution depend on differentiating factors among them (Márquez, 2024). This suggests that inequity in resources begins at the institutional level itself and widens the gap in the provision of a service that is vital to society. In virtual education, rurality and socioeconomic conditions are linked to student dropout risk (Guzmán Rincón et al., 2021), and among vulnerable groups, economically grounded reasons are also documented as significant (Segovia-García et al., 2024). An adjacent variable involves traditional teaching methods, which generate low interest and demotivation within the educational encounter, in addition to other key factors such as poor induction, inadequate pedagogical

support, and lack of knowledge of problem-solving tools available on campus, all of which lead to dissatisfaction and student absence (Ospina Hernández & Ceballos, 2025).

At the level of management and public policy, a Monte Carlo simulation model constitutes an effective analytical tool for feeding back the impact and scope of higher education policies through the use of projections while making assumptions and limits explicit (Guzmán Rincón & Valencia Quecano, 2024). In the same vein, a pandemic-era case study describes variations in dropout within a program and links the explanations to employment conditions and tuition relief measures, suggesting the economic levers that may help mitigate the situation (Poveda Pineda et al., 2025).

Barrier 2: Time (balancing study–work–family demands + participation friction).

In Colombia’s virtual-rural context, work and family obligations are reported as being associated with dropout (Guzmán Rincón et al., 2021). In the literature on online learning, learning behavior (participation/engagement) is identified as central and is associated with dropout when it declines early (Huang et al., 2023). For example, Haugom (2022), through the analysis of a university case, suggests that the transition from traditional teaching to a digital teaching model may increase student attendance, which is relevant as a mechanism for reducing commuting-related friction and improving time management, although attendance does not automatically equate to learning or student persistence.

Moreover, “time” is not only a matter of objective availability: procrastination is associated with dropout intention, adding a self-regulation dimension, as stated by Delgado-García et al. (2025). In e-learning, motivational factors and psychological needs (for example, relatedness) are also associated with dropout, indicating that time management is intertwined with connection and support (Dirzyte et al., 2023).

Barrier 3: Program–student fit (academic adjustment, assessment, relevance, and experience).

In data-based institutional models, academic and program-related variables differentiate dropout profiles (Falla & Vargas-Cañas, 2024), and trajectory-related variables (course repetition, cancellations) are associated with academic performance and are useful for early warnings (Gutiérrez-Monsalve et al., 2021). Barbeau et al. (2025) establish that academic adjustment can be understood as a process in which assessment structures both the way students study and their relationship with the program: perceptions of assessment are indirectly associated with academic adjustment through learning strategies.

At a broader level of university experience, environmental factors (hygienic) and capability-development factors (motivational) predict satisfaction and institutional loyalty (De-Juan-Vigaray et al., 2024), both of which are useful dimensions for interpreting student persistence as commitment, rather than merely as “enrollment.”

Barrier 4: Personal (well-being, motivation, academic identity, inclusion). The evidence shows that personal factors should not be reduced to a mere “lack of will.” For example, Del Savio et al. (2022) establish that during the COVID-19 pandemic, there was an increase in mental health-related problems and their relationship with dropout in a program, which calls for well-being-oriented approaches. This should not obscure the role played by academic institutions that function as exclusionary spaces, reproducing social inequality and, despite significant public investment, still falling short in addressing economic and social problems (García Aretio, 2021).

Likewise, instructor care and engagement are related to educational trajectories and dispositions (Okwuduba et al., 2022), and institutional support services may help sustain students when they face multiple barriers (Johnson et al., 2022). Among disadvantaged students, a series of barriers associated with discrimination and stereotypes have been identified, along with facilitators such as scholarships and mentoring, which places inclusion as a key dimension of both the “personal” and the “program” domains (Belando-Montoro et al., 2022).

2). Multilevel shared responsibility: from explanation to action

The evidence suggests that student persistence requires practical shared responsibility at three levels:

- **Macro-determinants (State/productive sector and public policy):** These arise in terms of reducing inequality, improving financing conditions, adopting policies that cushion economic shocks, and making responsible use of projections and planning models (Barbosa-Camargo et al., 2021; Guzmán Rincón & Valencia Quecano, 2024; Poveda Pineda et al., 2025).
- **Meso-determinants (HEI/program):** These are reflected in aspects such as the implementation of services, tutoring, technological support, pedagogical and assessment redesigns, and organizational capacity. At this level, one study shows that internal human talent management practices, leadership, service technology, and peer support influence staff extra-role behaviors, with implications for student experience and retention (Bukhatir et al., 2023). This makes visible that student persistence is also shaped in the institutional “backstage.”
- **Micro-determinants (student/household):** balancing time demands, self-regulation, well-being, sustained participation, and the timely use of support mechanisms (Guzmán Rincón et al., 2021; Delgado-García et al., 2025; Johnson et al., 2022; Huang et al., 2023).

3). Learning analytics layer: early warning, explainability, and targeted interventions

Recent literature makes it possible to strengthen the institutional “theory of action” by combining three components:

Risk prediction

Machinelearning models using academic data and LMS traces can demonstrate predictive capacity and emphasize the relevance of longitudinal variables that are susceptible to change over time (Vaarma & Li, 2024). In distance education, risk models with practical insights for virtual universities have been reported (Seo et al., 2024). An ensemble approach (logistic regression + neural networks + decision tree) has been proposed to support institutional decision-making, highlighting the need to contextualize the model to the reality of each higher education institution (Rabelo & Zárate, 2024).

Explainability

Models using XAI (SHAP/LIME) have been identified, and they report the advantage of identifying critical factors to guide concrete actions, thus preventing prediction from becoming a “black box” (Mustofa et al., 2025). In this logic, explainability serves as a bridge between analysis and management, insofar as it helps determine whether the intervention should be financial, academic, technological, or well-being-oriented, in accordance with the proposed typology.

Targeted intervention

Beyond predicting risk, uplift modeling is proposed to estimate whom it is most appropriate to intervene with because they will yield the greatest incremental benefit, thereby optimizing institutional resources (Olaya et al., 2020). This approach is especially relevant in contexts with limited resources and high heterogeneity (for example, vulnerable groups in virtual education), where it is not feasible to intervene equally with everyone (Segovia-García et al., 2024).

“Soulless education”: translation into measurable dimensions

“Soulless education” is retained as a metaphor denouncing a form of education that students experience as “meaningless,” disconnected from their life project and lacking genuine support. The literature in the corpus makes it possible to operationalize this metaphor into observable dimensions that can be incorporated into management and evaluation instruments:

- 1). Support and institutional accompaniment: use and impact of services and tutoring, as well as challenges in their utilization (Johnson et al., 2022).
- 2). Pedagogical bond and instructor care: perceived instructor care and engagement as conditions for sustained learning (Okwuduba et al., 2022).
- 3). Academic experience and adjustment: academic adjustment and its relationship with learning strategies and perceptions of assessment (Barbeau et al., 2025).
- 4). Satisfaction and institutional loyalty: environmental and capability-development factors that sustain satisfaction and allegiance (De-Juan-Vigaray et al., 2024).
- 5). Inclusion and equity: barriers and facilitators for disadvantaged students (mentoring, scholarships, discrimination) (Belando-Montoro et al., 2022).
- 6). Well-being and self-regulation: mental health and procrastination associated with dropout/dropout intention (Del Savio et al., 2022; Delgado-García et al., 2025).
- 7). Sustained participation and learning behavior: engagement patterns and their association with dropout in online environments (Huang et al., 2023).

These dimensions allow “soulless education” to cease being merely a moral judgment and become an evaluable hypothesis: when support, connection, adjustment, inclusion, well-being, and participation deteriorate, the risk of dropout increases, especially when money- and time-related barriers coexist.

“Soulless education” is constructed under the force of indifference, bounded by key agents such as the state, institutions, and society itself. However, in Colombia there is a dropout prevention system, SPADIES, responsible for identifying key factors that generate this process and for enabling follow-up on inadequate academic conditions, as well as solid support for the circumstances that produce a lack of interest in remaining within the educational system.

However, Colombia continues to be one of the countries reporting high dropout rates, driven by structural problems in the educational system, particularly in training programs from primary education through higher education, which are based on obsolete forms of learning and inadequate strategies that fail to keep pace with students’ educational needs (Gutiérrez A. et al., 2021, 4–5).

Conclusions

University dropout in Colombia must be addressed as a multicausal and multilevel phenomenon, sensitive to territorial and institutional inequalities (Arias et al., 2024; Barbosa-Camargo et al., 2021). Accordingly, the operational typology based on money, time, program–student fit, and personal factors offers a practical framework for diagnosis and intervention design, consistent with Colombian evidence on virtual education and vulnerability (Guzmán Rincón et al., 2021; Segovia-García et al., 2024), as well as with institutional academic signals (Falla & Vargas-Cañas, 2024; Gutiérrez-Monsalve et al., 2021).

The relationship between virtual educational processes and social relations must be closely connected to key factors such as interactivity, reciprocity, and empathy among the parties involved, making appropriate use of digital

environments and mediating knowledge through strategies aligned with student needs and well-being (Febres-Cordero Colmenárez, 2021, 10).

Effective shared responsibility requires the articulation of macro-determinants (equity and financing), meso-determinants (services, teaching, management, and organizational culture), and micro-determinants (self-regulation, well-being, and participation). Evidence on internal practices and staff behaviors suggests that student persistence does not depend solely on the student, but also on the organizational capacity to sustain the student experience and provide support (Bukhatir et al., 2023).

In terms of evidence-based management, risk prediction must be complemented by explainability (XAI) and targeted intervention designs (uplift modeling), thereby avoiding “alerts” that do not lead to action or that overload the system (Mustofa et al., 2025; Olaya et al., 2020; Vaarma & Li, 2024; Seo et al., 2024).

The metaphor of “soulless education” can be transformed into an empirical agenda for the management of public policy in higher education, operationalizable through indicators of support, pedagogical connection, adjustment, satisfaction, inclusion, well-being, and engagement. This makes it possible to assess whether institutional changes genuinely improve student persistence rather than merely enrollment, for which data analytics tools are required in order to anticipate early warnings of potential student dropout (De-Juan-Vigaray et al., 2024; Barbeau et al., 2025; Belando-Montoro et al., 2022; Johnson et al., 2022; Okwuduba et al., 2022; Huang et al., 2023).

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