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School dropout, lag and repetition: strategies for inclusive and sustainable education in the framework of public policies

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Abstract: This study examines the structural factors that contribute to school lag and dropout in students from vulnerable areas. Factors include community violence, economic precariousness, and complex family dynamics, within the context of the post-pandemic impact. Through interviews, participatory observation, and documentary analysis, the experiences of students, teachers, and educational authorities are collected to identify patterns of exclusion. The results show that the socioeconomic context that affects students' motivation, attendance, and school performance, especially in areas with gang presence, is a lack of safe transportation, and poor access to basic services. The pandemic amplified these difficulties by affecting skills such as reading, writing, and math, generating a significant lag as well as an emotional disconnection from school. Although the Ministry of Education implements welfare programs, such as subsidies for food and transportation, their effectiveness is limited in the face of the magnitude of the needs, which generates dissatisfaction in the community. In response, alternative modalities have been explored, such as homeschooling and playful learning programs, as well as interventions in mathematics education that seek to strengthen basic and practical skills, although their impact is still uncertain. This study highlights the need for educational public policies that address the structural causes of dropout and offer early intervention strategies, safe school environments, and teaching methods that connect theory with practice, promoting quality education for all.

Keywords: *Educational exclusion, Post-pandemic impact, Repetition, School dropout, School lag.*

1. Introduction

Educational lag understood as the proportion of students who are at educational levels below the corresponding one for their age, is a persistent problem in Latin America. According to Ceballos (2022), this problem significantly affects students who, for various reasons, need more time to complete their primary education. In contexts of high marginalization, the effects of educational lag are even more pronounced, which translates into a perpetual cycle of inequality and social exclusion. Previous research has identified poverty as one of the key factors in the persistence of this phenomenon (Yurén et al., 2005).

However, in countries like Panama, educational lag is not only due to poverty. There are also other factors, e.g., the quality of teaching, school infrastructure, and socioeconomic conditions play important roles; (Boniolo & Najmias, 2018; Ceballos, 2022). In national education systems, the use of statistical tools for the analysis of school performance data, especially through standardized assessments, has made

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it possible to deepen the study of variables such as lag, dropout, and failure (Martínez Rizo, 2018). These assessments, which include international tests, such as the Programme for International Student Assessment (PISA) and the Third Regional Comparative and Explanatory Study (TERCE), have been legitimized as reference mechanisms for assessing academic performance, including performance in key areas such as mathematics education, and have been valuable for the design of educational policies in the region (Silveyra, Yáñez & Bedoya, 2018). Mathematics education has been identified as a key area in which students face significant challenges, underscoring the need for innovative pedagogical approaches to strengthen their mathematics skills and reduce educational lag. This is an important concern of the Chamber of Commerce of Panama (UNICEF, 2022).

In this context, quantitative studies have been developed that analyze the impact of different educational programs on academic performance. For example, Silveyra, Yáñez and Bedoya (2018) evaluated the Full-Time Schools Program in Mexico, highlighting that this initiative has positive effects on the academic performance of students, especially those from vulnerable contexts, including improvements in fundamental areas such as mathematics education. This type of program provides additional time for learning and reinforcement in mathematics, a subject in which students usually have greater difficulties. Likewise, research in Ecuador and other countries in the region underscores the impact of student dropout on the quality of university graduates and the need to strengthen mathematical training from the initial levels to ensure key competencies in the labor market (Bazantes, Ruiz Carpio & Álvarez Gutiérrez, 2016)

Additionally, in case studies, such as that of Yurén et al. (2005) in Mexico, it has been observed how the "school habitus" and the "world of life" of migrant students create a barrier that hinders their academic progress. This dynamic is common in various Latin American contexts, where education systems face the challenge of closing inequality gaps and adapting their policies to complex social realities.

This research seeks to broaden the analysis of educational lag in Panama, incorporating an approach that takes into account both structural factors and pedagogical practices. To this end, data from standardized assessments will be analyzed and compared with the results of educational programs implemented in other countries in the region.

2. Background

Student dropout in school education is a complex phenomenon that affects the quality of the graduate and has a significant impact on society. Various studies address this issue from multiple perspectives, allowing us to understand critical factors that contribute to the retention (permanence) or dropout rate of students in university contexts. Among these factors, abstract subjects and especially mathematics education occupy a prominent place, since difficulties in this area often influence general academic performance and are a frequent cause of demotivation and dropout. The lack of basic mathematical skills, especially at levels that require a solid mastery of this discipline, can be a major barrier to student permanence, highlighting the need for support programs and pedagogical strategies that strengthen the teaching of mathematics in school education. In this sense, Ávila (2014) highlights the importance of contextualizing mathematics education within specific sociocultural frameworks, and in indigenous education, which may be relevant to promote an inclusive approach to mathematics teaching. In addition, Chacón (2003) mentions the concept of "emotional mathematics", which highlights how the student's emotions and experiences influence their relationship with mathematics, suggesting that teaching strategies should consider these aspects to prevent dropouts. On the other hand, Font, Godino, & D'Amore (2007) propose an Ontosemiotic Approach to understanding mathematical representations, which may be key in the formation of pedagogical strategies that address the cognitive and emotional difficulties of students in this discipline.

Bazantes, Ruiz Carpio and Álvarez Gutiérrez (2016) investigated dropout rates in Ecuador, highlighting how high dropout rates influence the quality of the graduation profile of high school students. Accordingly, Durán Encalada & Díaz Hernández (1990) analyzed the problem of dropout in the Autonomous University, revealing structural factors that affect permanence, such as the lack of specific support programs.

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On the other hand, Abello et al. (2016) propose the concept of "learner identity" as an analytical tool to understand students' experiences and their relationship with permanence or dropout. This approach highlights how lived experiences in the academic environment shape students' attitudes toward education and affect their decision, whether or not to continue in the university system.

Another relevant aspect is the importance of induction and academic support programs, which have proven to be effective in reducing student dropout. Aguilar Santamaría (2017) and Aravena Vega et al. (2018) discuss how an adequate pedagogical proposal and induction programs, aimed at students in vulnerable situations, can facilitate their integration into the university environment and promote retention.

The study by Garzón Umerenkova & Gil Flores (2017) introduces the role of academic procrastination as one of the risk factors for dropout, while González-Ramírez & Pedraza-Navarro (2017) investigate socio-family variables that affect school dropout. Both studies suggest that individual and contextual factors should be considered when analyzing the reasons behind college dropout rates.

In addition, Flores López et al. (2016) highlight the role of professional educational development and support centers as effective strategies for the observation and reduction of dropout rates. These centers provide resources and support for students at risk of dropping out, fostering a more inclusive and retention-focused environment.

The analysis of school lag and dropout in Panama involves addressing complex structural factors that are closely related to community violence, economic precariousness, and the impact of the pandemic, with its tangible effects on the performance and permanence of students in the school system. This especially has affected the low reading comprehension of third-grade students in rural areas of Panama, which has reached 85% without knowing how to read and write well after the post-pandemic years. The contemporary scientific literature offers diverse perspectives to understand how these factors affect academic performance and the chances of long-term school success.

2.1. Community Violence and Economic Precariousness

Community violence and economic precariousness are structural factors that have a profound impact on the learning environment and the permanence of students in the education system. According to González-Ramírez & Pedraza-Navarro (2017), students who grow up in contexts of social violence and poverty tend to experience an unstable family and social environment, which negatively impacts their academic performance and generates high dropout rates. This situation is reflected in the lack of access to educational resources and in a decreased motivation to continue in education.

Economic precariousness, in turn, generates an additional disadvantage for students who come from low-income families, who face barriers, such as lack of educational materials, insufficient school infrastructure, and limited access to health services. This situation is complemented by the findings of Díaz (2009), who explains that the lack of family and economic support is a determining factor in school dropout rates since students cannot assume the costs associated with their education or must work to support their families, which reduces their time and energy to study.

2.2. The Impact of the Pandemic: Lag in Basic Skills and Disconnection from School

The impact of the COVID-19 pandemic has accelerated and exacerbated structural problems in education. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2020), school closures during the global health crisis had devastating effects on students' skills, particularly in fundamental areas such as reading, writing, and mathematics. The lag in basic skills, a direct consequence of the interruption of face-to-face education, has been widely documented in studies on the impact of the pandemic on education (Abello et al., 2016; Aravena Vega et al., 2018).

In addition, the emotional and academic disconnection with the school has intensified due to the lack of face-to-face interaction, which affects students' motivation towards and sense of belonging within the educational system. According to Acosta, Abreu & Coronel (2015), this phenomenon generates a distancing that results in higher school dropouts, since many students do not perceive a clear purpose for their education when they do not feel part of the school process.

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2.3. Recovery Efforts: Wellness Programs and Flexible Learning Modalities

Given the magnitude of the lag gap and dropout rates, recovery efforts must be strategic and include wellness programs and flexible learning modalities that adapt to the realities of students. Contemporary literature (Castillo Bustos & Montoya Rivera, 2015) stresses that school well-being programs, such as those that offer psychological, nutritional, and social support, are essential to creating an environment conducive to learning, especially in contexts of high vulnerability. These programs can counteract the negative effects of community violence and economic precariousness, giving students the tools they need to overcome the social and emotional barriers they face.

In addition, flexible learning modalities, such as distance education and hybrid models, have positioned themselves as key strategies to ensure educational continuity, especially in times of crisis. According to Garzón Umerenkova & Gil Flores (2017), flexibility in the educational modality is essential to adapt learning to the specific needs of students, allowing those who cannot regularly attend face-to-face classes, due to health conditions, work duties, or economic difficulties, to continue learning at their own pace.

Structural factors such as community violence and economic precariousness, added to the impact of the pandemic on education, making up a challenging scenario for students in Panama. These factors hinder their access, permanence, and success in the education system. However, recovery efforts, through wellbeing programs and flexible learning modalities, offer a promising avenue for mitigating these negative effects. To achieve sustainable results, inter-institutional collaboration is required to implement these strategies effectively, considering the particularities of each educational and social context.

3. Methodological Framework

3.1. Study Approach

The study uses a qualitative interpretive approach, as it seeks to explore and understand the perceptions, experiences, and structural challenges that influence school lag and dropout in students from vulnerable environments. The interview provided shows the complexity of the factors, combining socioeconomic, cultural, and educational aspects, which requires a methodology that values the subjectivity of the experiences.

3.2. General Objective

To analyze the structural causes of school lag, dropout, and repetition in public school students from vulnerable areas, considering the interaction between social, economic, and educational factors.

3.3. Research Questions

- What social and economic factors have an impact on the academic trajectory of students in vulnerable areas?
- What is the role of community violence and economic precariousness in school dropout rates?
- How has the pandemic affected students' academic skills and motivation?

3.4. Population and Sample

- Population: Educational authorities, teachers, and students of public schools in vulnerable areas (in the capital and rural areas).
- Sample:
- Educational authorities: Representative of the Ministry of Education.
- Teachers: Teachers in schools located in at-risk areas.
- Students: Young people affected by school lag after the pandemic.

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3.5. Data Collection Techniques

Data collection in this research was developed through a qualitative mixed methods strategy. This made it possible to explore the perceptions of key actors in the education system and to analyze attendance patterns and academic results. The following techniques were used:

Semi-structured interviews: The interviews were conducted with educational authorities and teachers, using a guide with open and flexible questions that allowed for in-depth exploration. The interviews were designed to capture perceptions about educational challenges related to poverty, community violence, and malnutrition. In addition, they sought to obtain information on the welfare programs implemented by the Ministry of Education and the educational experience during and after the pandemic. The selection of interviewees was based on convenience sampling, considering the availability of Ministry authorities and teachers in areas identified as "red zones".[1]

Participatory Observation: Visits were made to public schools, located in areas of high social risk, to carry out direct observation. This technique made it possible to record the daily context of the institutions, identifying patterns of attendance, student participation, and the dynamics of interaction between students, teachers, and the community. The observation also focused on capturing the logistical and pedagogical challenges faced by schools, as well as the resources available. Detailed field notes were used to document these observations, which were then incorporated into the qualitative analysis.

Documentary Analysis: A critical review of official documents of the Ministry of Education was carried out, including reports on the Student Welfare Program, the management of the Education Equity and Quality Fund (FECE), and the standardized tests applied between 2018 and 2022. These reports provided quantitative data on the scope of assistance programs and academic performance. In addition, curricular guidelines and technical reports on the implementation of flexible learning modalities, such as *homeschooling* and digital learning systems, were analyzed.

- **Semi-structured interviews**: In-depth interviews were conducted with educational authorities, such as the one provided, to explore participant perceptions of educational challenges.
- **Participatory observation**: Visits to public schools in red zones to record patterns in school attendance and participation were made.
- **Documentary analysis**: Evaluation of reports from the Ministry of Education on student welfare programs and standardized tests carried out between 2018 and 2022.

3.6. Data Analysis

The analysis of the qualitative data was carried out using thematic coding. Through this technique, the data were fragmented into significant units, categorized by recurring themes, and analyzed according to the relationships between them.

The analysis followed a thematic coding, where common and divergent patterns between the interviews will be identified. Atlas.ti software was used to organize and categorize qualitative data.
Preliminary categories include:

- Structural factors: Community violence and economic precariousness.
- Impact of the pandemic: Lag in basic skills and disconnection from school.
- Recovery efforts: Wellness programs and flexible modalities, such as the extended day, were the solution most valued by all the experts interviewed.

3.7. Validity and Reliability

To ensure the validity of the study, data were triangulated among interviews, observations, and official documents. Peer reviews were conducted with participating teachers to validate the preliminary interpretations.

[1] The Red Zone in Panama is understood as the popular neighborhoods that have the highest number of cases of violence.

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4. Results

4.1. Socioeconomic and Contextual Factors

Most students in the public schools came from low-resource settings, where community violence and a lack of basic infrastructure (such as transportation, health, and safety) were common. Vulnerable urban areas, such as San Miguelito, were marked by the presence of gangs, which generated an environment of insecurity that negatively affected school attendance and performance.

4.2. The Impact of the Pandemic on Education

The interviews revealed that a high percentage of students who went through the pandemic have difficulties in writing and reading comprehension, as a result of the limited interaction with teachers during confinement. The introduction of new digital tools has improved some skills, but significant gaps persist among students.

4.3. Institutional Efforts and Student Welfare

The Ministry of Education implemented food and transportation subsidy programs to support students in vulnerable situations. However, the authorities highlight that although these efforts have alleviated some difficulties, the impact was slow and not always visible to the community, which led to skepticism about the progress.

4.4. New Learning Modalities

Flexible modalities, such as homeschooling and game-based learning programmes, are being tested to adapt to the needs of students, in some areas, the extended day was introduced and has had incredibly positive results. These strategies are still in the pilot phase but offer promising prospects for improving school retention in the long term.

4.5. Cycle of Intergenerational Inequality

The interviews highlight a cycle of abandonment and apathy towards education that is passed down from generation to generation. Many parents, having left school prematurely, lack the tools to motivate their children to continue their education. This perpetuates a vicious cycle of low educational motivation and abandonment in the new generations.

Table 1.
Structural factors – causes of school lag and dropout.

Factor	Description according to authorities	Identified impact
Community violence	Many students do not finish high school (7th, 8th, and 9th); crime affects their educational continuity.	Disconnection from the education system.
Family dysfunction	Lack of father figures and family support.	Low self-esteem and school dropout.
Environmental pressure	Distractions such as cell phones and bad influences.	Increase in dropouts.
Schools without resources	Unattractive school environments and lack of infrastructure.	Demotivation of students.

The factors mentioned in Table 1. coincide with the findings of several previous studies on the impact of social and educational conditions on school performance and permanence. In particular, the analysis of international tests such as PISA and TERCE, which assess aspects related to academic performance and educational equity, underlines that students from disadvantaged backgrounds face greater challenges, not only in terms of violence and poverty but also in terms of the conditions of school infrastructures (Martínez Rizo, 2018). In addition, the literature on ethnomathematics, such as that of Ávila (2014), demonstrates how socioeconomic and cultural factors affect how students from vulnerable communities perceive and connect with educational content, such as mathematics, which has

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an impact on their academic performance and their permanence in the education system. In rural areas and regions, factors such as malnutrition significantly affect students' performance in the classroom. Many of them lack access to early childhood education between the ages of 0 and 4, and only some attend at age 5 before entering first grade directly. This has an impact on their reading comprehension, which tends to be very poor, and especially hinders their performance in abstract subjects. This situation contributes to the lag and school dropout at the basic and secondary education levels (UNICEF, 2022).

Table 2.
Impact of the pandemic and school lag.

Category	According to authorities	Effect
Study habits	The pandemic affected the formation of study habits at home.	Low self-esteem and poor academic performance.
Difficult transitions between levels	Going from primary to high school and from high school to high school shows a high dropout rate (20%).	Students lose interest in continuing.
Curriculum without significant impact	School content is not aligned with real needs.	Disconnection between what has been learned and everyday life.

The results presented in this table underscore how the pandemic intensified pre-existing problems in the education system, such as the lack of alignment between the curriculum and the real needs of students, difficulties in transitioning between educational levels, and the loss of study habits. The existing literature reinforces these findings, showing that the disconnect between academic content and students' daily lives contributes to school lag and dropout. To mitigate these effects, it is essential to review and adjust pedagogical strategies, including a more contextualized and relevant approach to students, especially in critical areas such as mathematics education. The integration of innovative and flexible methods, such as hybrid teaching or the use of more accessible educational resources, can be key to reducing the negative impact of the pandemic on education.

The impact of the pandemic on education has been widely studied, and the findings in this table coincide with the results of various studies. For example, in their study on the impact of the pandemic on educational programs in Mexico, Silveyra, Yáñez and Bedoya (2018) found that the lack of resources and the disconnect between the curriculum and the needs of students severely affected academic performance, particularly in vulnerable contexts. The transition between educational levels, as observed in the literature on school dropout (Martínez Rizo, 2018), is a critical period that can be aggravated by factors such as lack of motivation and disconnection with academic content.

In the context of abstract subjects, and especially mathematics, the impact of the pandemic is also evident. Ávila (2014) and Font, Godino & D'Amore (2007) have argued that mathematics teaching must be contextualized and relevant to students, otherwise, the contents become abstract and inaccessible. During the pandemic, distance learning exacerbated this disconnect, as many students did not have access to adequate resources to learn effectively, which increased difficulties in key areas such as mathematics.

Table 3.
Recovery efforts – proposals and strategies.

Proposal	Description according to teachers	Expected impact
Creation of optimal environments	Schools with adequate resources, and attractive and clean areas.	Increased student retention.
Early warnings	Implementation of systems to detect risks of delay in time.	Prevention of school dropout.
Promoting hands-on learning	Teaching is based on experiences and continuous practice, with extended days and extracurricular activities that make the school attractive. Primary school teachers	Increased motivation and meaningful learning.

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	master pedagogy, but not technology; In secondary school, teachers know the technology, but lack pedagogical training.	

The table presents three key proposals to improve student retention and reduce dropout in educational institutions. Next, an analysis and discussion of each of the proposed strategies was carried out, contrasting them with the aforementioned quotes, which addressed factors related to student dropout and retention rates in the university contexts.

The strategies proposed in the table coincide with several key recommendations and findings from the literature on attrition and retention. Durán Encalada & Díaz Hernández (1990) suggest that prevention strategies should be implemented at the institutional level, based on the improvement of teaching conditions, psychological support, and the creation of spaces for social integration. In this context, creating optimal environments and fostering hands-on learning not only helps improve academic performance but also provides an environment in which students feel more engaged and supported.

Likewise, early warnings are a prominent strategy in the literature, as observed in the study by Donoso and Schiefelbein (2007), where it is stated that the implementation of mechanisms for the early detection of academic difficulties allows for effective intervention before students reach the point of dropping out.

Finally, hands-on learning has been widely documented as a positive factor in retention, particularly in areas that require applied skills such as science and mathematics. Abello et al. (2016) highlight the importance of teaching that connects theory with practice, providing students with a sense of purpose and relevance in their studies.

The strategies proposed in the table—creating optimal environments, providing early warnings, and fostering hands-on learning—align with the best practices identified in the literature to reduce student dropout. These actions not only seek to improve academic performance but also to create an environment of emotional and academic support that allows students to continue with their education, overcoming the obstacles they may face. The implementation of these strategies can be key to improving student retention, especially in contexts of vulnerability or academic challenges.

4.6. Analysis of Interviews and Secondary Data

Atlas.ti has been used to code the interviews, allowing us to identify key patterns in the preliminary findings presented in the following categories:

4.6.1. School Dropout and Lag by Educational Level

- Pre to middle school (7th to 9th): This is the level with the highest dropout rate, where many students drop out of the system or fall behind.
- Medium (10th to 12th): It also shows a significant loss of students (20%).

4.6.2. Shared Responsibility

It highlights that multiple actors are responsible for the lag, including:

- Families: Due to a lack of promoted study habits and emotional support.
- Teachers: Some instructors do not meet the appropriate profile.
- Educational System: With infrastructure and curriculum problems providing little significant educational support.

4.6.3. Differentiated Problems by Zone

- Urban Areas: Greater impact of distractions and peer pressure.
- Rural Areas and Regions: Lower dropouts, but with problems of access to resources such as internet and food.

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4.6.4. Strategies Suggested by the Interviewee

- Attractive and motivating environments: It is emphasized that schools should be spaces in which students want to stay.
- Practical learning: It proposes to promote methodologies that prioritize practice over theory.
- Early warnings: It proposes systems to identify and mitigate the lag proactively.

The analysis of interviews and secondary data was carried out with the support of Atlas.ti, reveals key patterns on the causes and consequences of school lag and dropout, as well as possible solutions. Several fundamental categories were identified that explain the current challenges of the education system. First, school dropout and lag are particularly pronounced at the pre-secondary level (7th to 9th), where many students drop out or fall behind in their academic career, a situation that also persists in middle school (10th to 12th), with a significant loss of up to 20% of students. According to Bazantes, Ruiz Carpio and Álvarez Gutiérrez (2016), dropout at these levels is associated with a disconnect between academic content and the real needs of students, which generates demotivation and, in many cases, school dropout.

The analysis also highlights the shared responsibility in school lag, where different actors influence this phenomenon. Families play a crucial role, as a lack of emotional support and proper study habits contribute to poor performance. In this sense, Donoso and Schiefelbein (2007) point out that family support is one of the determining factors in school permanence since students who do not receive support at home are more likely to drop out of school. On the other hand, teachers and the education system are also responsible, since many educators do not meet the appropriate profile and infrastructure problems, and an irrelevant curriculum hinders learning. Álvarez Pérez and López Aguilar (2017) reinforce this idea, stating that teacher quality and curriculum adequacy are key factors in reducing dropout and lag.

Likewise, differentiated problems were identified by area, where urban areas have a greater impact of distractions and social pressures, while in rural and regional areas the dropout rate is lower, but problems of access to essential resources such as internet and food persist, which limits academic performance. These findings coincide with those of Chong González (2017), who states that socioeconomic factors and access to resources are determinants of school performance, especially in rural areas.

Finally, the efforts proposed by the interviewees include key strategies such as creating engaging and motivating environments, implementing hands-on learning, and using early warnings to proactively identify and address the lag. These proposals are aligned with what is recommended by Núñez Naranjo (2020), who stressed the importance of stimulating learning environments and the use of active methodologies to improve motivation and reduce dropout. In addition, Abello et al. (2016) reports that the use of early warning systems is essential to identify at-risk students and offer them the necessary support before dropout is irreversible. These strategies, when implemented in a coordinated manner, could contribute significantly to reducing lag and improving school retention at all levels of education.

5. Discussion

The study has identified several key factors that influence the academic trajectory of students in vulnerable areas, particularly those related to social and economic aspects, and the repercussions of the pandemic. These factors are discussed below based on the findings obtained in the interviews and the analysis of secondary data, considering the current educational context.

5.1. Social And Economic Factors That Impact the Academic Trajectory of Students in Vulnerable Areas

Students in vulnerable areas face multiple social and economic barriers that affect their performance and educational continuity. In particular, economic precariousness plays a fundamental role, as low-income families have difficulty providing educational materials, internet access, or even adequate food for the development of students. Álvarez Pérez and López Aguilar (2017) point out that the lack of resources not only limits access to quality education but also increases the level of stress in students, which negatively affects their academic performance. In addition, social inequalities amplify students'

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difficulties in staying in the education system, as development expectations are much higher in urban contexts, where educational opportunities tend to be greater. However, in rural and regional areas, although dropout is less pronounced, problems persist related to the lack of adequate infrastructure, such as limited internet access, which limits students' ability to complete their studies effectively.

5.2. The Role of Community Violence and Economic Precariousness in School Dropout

Community violence emerges as one of the most critical factors in school dropout. In many urban areas, especially in areas where crime and insecurity are high, students face a hostile environment that affects both their emotional well-being and their willingness to learn. Bazantes, Ruiz Carpio and Álvarez Gutiérrez (2016) highlight that violence generates a disconnect between students and the education system, as many are forced to drop out of school due to insecurity in their environment. This violence not only refers to physical confrontations but also to psychological and social violence that affects the emotional stability of students. At the same time, economic precariousness becomes a determining factor, since families from vulnerable sectors often face difficulties in covering the costs associated with education, such as uniforms, materials, and transportation. Donoso and Schiefelbein (2007) state that the lack of basic resources at home pushes many students to drop out of school to help with economic activities, exacerbating school dropout in these contexts.

5.3. The Impact of The Pandemic on Students' Academic Skills and Motivation, and the COVID-19 Pandemic Has Had a Profound Impact on Students' Motivation and Academic Skills

The abrupt transition to online education exposed inequalities in access to technology and the internet, which particularly affected students in vulnerable areas. According to Chong González (2017), the lack of adequate technological infrastructure and the impossibility of accessing virtual classes have left many students without the possibility of continuing their education. This situation has aggravated the school lag, especially at transition levels such as the transition from primary to pre-middle, where many students face difficulties in adapting to the new academic demands. In addition, the change from having a single teacher to having several teachers in preschool, Schlechty (2001), is a cause of the high school lag due to lack of adaptation, social isolation and the loss of direct contact with their classmates and teachers have negatively affected motivation, by reducing opportunities for interaction and collaboration. Low self-esteem and emotional disconnection from the educational process, as highlighted in the findings of the study by Díaz (2009), have been determining factors in the increase in dropout rates during the pandemic, especially among the most vulnerable students.

In summary, the combination of social and economic factors, and the direct effects of violence and the pandemic have generated a challenging environment for students in vulnerable areas. These factors not only affect their academic performance but also increase dropout rates, requiring a comprehensive intervention that addresses both students' educational and socioeconomic needs. It is essential to implement strategies that favor access to educational resources, emotional support, and the creation of safe and attractive learning environments to mitigate these impacts.

6. Conclusion

The conclusions of this study highlight the multifactorial nature of school lag and dropout in Panama, highlighting several critical factors and practical recommendations to mitigate these problems effectively. The analysis details that school dropout cannot be attributed solely to academic factors, but is also influenced by socioeconomic and cultural components, as previous studies have suggested in other Latin American contexts (Bazantes, Ruiz Carpio and Álvarez Gutiérrez, 2016; Durán Encalada & Díaz Hernández, 1990).

One of the main conclusions is that the lack of family support and adequate school resources is a significant obstacle to permanence in the education system. As stated by Abello et al. (2016) and Garzón Umerenkova & Gil Flores (2017), family accompaniment and support are crucial to maintaining motivation and continuity in studies, suggesting that policies should be designed to reinforce the learning environment inside and outside school.

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This study also supports the creation of engaging educational environments that foster student motivation and interest. Castillo Bustos and Montoya Rivera (2015) argue that the design of more creative pedagogical strategies, connected to students' real lives, contributes to greater academic engagement, and can reduce dropout rates. Along these lines, it is recommended to strengthen the educational offerings via practical learning approaches, as suggested by Aguilar Santamaría (2017) and Álvarez Pérez & López Aguilar (2017). These approaches would allow students to see a direct application of their learning in their environment, thus strengthening their motivation and sense of belonging to the educational system.

In addition, an important advance in the retention of students in rural areas could be achieved through the construction of classrooms in primary schools that allow the extension of the educational offers to pre-secondary schools. This responds to a need observed in the Panamanian context, where many students drop out of education after primary school due to the lack of pre-secondary institutions in their communities. Studies, such as that of Aravena Vega et al. (2018), indicate that lack of adequate infrastructure and local access to higher education levels are factors that have a direct impact on student retention in vulnerable contexts.

To achieve these changes, an inter-institutional collaborative approach is required, where government, educational organizations, and communities work together to implement these strategies. This approach coincides with what was suggested by Donoso & Schiefelbein (2007), who highlight the importance of a coordinated national strategy to address dropout through systematic interventions.

This study reaffirms that student dropout and school lag in Panama are complex problems that require comprehensive and long-term responses. Recommendations include expanding school infrastructure, including early childhood education, implementing hands-on learning methods, and promoting inclusive educational environments. However, for these proposals to be sustainable and effective, it is essential to promote a cultural change in the perception of education, accompanied by a committed investment in the development of public policies aimed at inclusion and educational equity. In this context, programs such as coaching and mentoring turn out to be ideal tools in the fight against school lag. In this sense, it would be important to update the teacher training curriculum of the universities that train future teachers.

Applied to schools, new technologies have proven to be very effective in reducing school dropouts and backwardness. In this regard, the Ministry of Education of Panama, through the National Directorate of Educational Evaluation, has conducted a reading comprehension program through a digital platform (Fiction Express) during the years 2023 and 2024 with students nationwide from fourth grade of primary school to twelfth year of secondary school. Students can read novels online through computers, cell phones, or other devices at school, home, or other places using the digital platform. The program currently has more than seven thousand students enrolled, in 40 schools using the platform, more than 50,000 chapters have been read. They achieve 15 minutes of sustained reading per chapter. and 2 books per student have been completed.

Students were asked to suggest to the novel's author how the next chapter should be written. By writing the next chapter based on the students' suggestions, the author kept the students interested in the novel's plot. Moreover, the teachers of the language and computer science subjects, in charge of the program, have had a lot of data on the students, such as the improvement in the minutes spent reading the chapter, the times they interrupt the reading due to lack of attention, the times they consult the dictionary and the time dedicated, if there are dyslexia problems, etc. This information has allowed teachers and Ministry of Education officials to personally assist the students.

As a consequence of the average 23% increase in reading comprehension, students improved their attention and understanding in abstract subjects such as natural sciences and mathematics, significantly reducing boredom and lagging behind.

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