Attrition Factors and Retention Strategies in Distance Higher Education

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***Abstract*—Distance higher education faces significant challenges in student retention, affected by economic, academic, personal and technological factors. This study aims to identify the main causes of attrition and propose strategies to improve retention in this modality. Using a mixed approach, quantitative data from 3,835 students enrolled in a higher education institution in Ecuador were analyzed, complemented by qualitative interviews with administrative and teaching staff. The results revealed that economic (34.09%) and academic (27.79%) factors are the main barriers to retention, followed by family and personal problems (13.75%). In addition, limitations related to access and use of information technologies were identified, such as the lack of technological resources and the digital divide, which affect student performance. In conclusion, a comprehensive strategic plan is proposed that includes personalized tutoring, financial support, improvement of technological infrastructure and student welfare services. These strategies seek to reduce dropout, strengthen the educational experience and promote academic success in the distance learning modality.**

***Keywords*—permanence, personalized tutoring, student wellbeing, family factors**

I. Introduction

Distance higher education emerges as a flexible option for those who balance studies and other responsibilities [1]. However, one of the main challenges is student retention, since the high dropout rate negatively affects students and educational institutions [2]. This phenomenon, multifactorial in nature, requires an exhaustive analysis of the causes that lead students to abandon their studies, as well as the variables that influence their permanence.

Retention in higher education is a key indicator of institutional quality and academic success. University dropout in the distance modality constitutes a highly complex multi-causal phenomenon, intensified by the educational transformations caused by the COVID-19 pandemic. Various personal, family, economic, institutional and academic factors influence this process, whose manifestation varies according to the student's profile and the context in which he/she develops his/her education. In the Ecuadorian case, it has been shown that students over 30 years of age, belonging to the lowest economic quintiles, graduates of public institutions and with family responsibilities, are more likely to abandon their studies, especially in the first academic cycles [2, 3]. This is compounded by isolation, self-management of learning and limited interaction with the academic community, characteristics of the distance mode, which hinder integration and reduce retention rates. From a qualitative perspective, it has been identified that the abrupt transition from face-to-face to virtual during the pandemic exacerbated technological, pedagogical and social gaps, especially in vulnerable sectors, generating an environment that is not conducive to educational continuity at all levels of the system [4].

Quantitative analysis using logistic regression models has allowed predicting with 76.44% accuracy dropout behaviors according to variables such as type of school of origin, income level, age of entry and study modality [5]. Overall, both studies agree on the need to redesign institutional accompaniment strategies, prioritizing the strengthening of pedagogical design, personalized academic tutoring, teacher training in digital competencies and the provision of technological resources as key conditions to mitigate dropout and improve retention in remote education environments.

Studies have identified critical factors that influence student retention, such as academic support, availability of technological resources, interaction with teachers and peers, and balance between personal and academic life [6]. To address these challenges, it is essential that HEIs implement comprehensive strategies that foster a favorable educational environment and promote student retention. In this sense, the creation of a strategic plan becomes an essential tool to identify strengths, weaknesses and opportunities for improvement in student retention [7].

Student retention in higher education is a topic of growing interest in the academic literature, especially in the context of the distance modality. This phenomenon has been widely studied due to its impact on educational quality, institutional efficiency and students' academic success [8]. Retention is defined as the capacity of an institution to keep its students enrolled until the completion of their studies, and is considered a key indicator of institutional performance [9].

This study aims to develop a strategic retention plan to increase the graduation rate of distance learning students in HEIs in Ecuador. Through a mixed approach that combines quantitative and qualitative methods, the main factors that contribute to student dropout are identified and evidence-based strategies to improve retention are proposed. The implementation of this plan not only seeks to increase retention rates, but also to improve student satisfaction and the perception of educational quality in the institutions. In

Ecuador, despite the sustained growth of virtual education, there are gaps in empirical research on the causes of dropout in this modality, as well as on the effectiveness of institutional strategies implemented to mitigate the problem. Recent studies address university dropout from multifactorial approaches, pointing to economic, academic, personal and technological causes [10, 11], but there are still debates about the predictive capacity of these models and the institutional adaptation to the needs of students in non-face-to-face environments.

Indeed, although widely disseminated theoretical models have been proposed (such as Tinto, Bean or Spady), there are discrepancies regarding their applicability in educational systems with heterogeneous structural conditions such as those in Latin America [12]. Additionally, the literature has begun to integrate transdisciplinary approaches and artificial intelligence-based analyses to predict dropout [8], which evidences a transition towards more integrative perspectives, although with limited practical implementation. This study seeks to contribute to this field through a mixed analysis that identifies determinants of dropout in an Ecuadorian university and proposes specific retention strategies in the context of distance education. It is an approach that not only includes the structural factors that influence dropout, but also integrates qualitative perceptions of key actors to strengthen institutional actions aimed at student retention.

A. Student Retention

Student retention refers to the capacity of an educational institution to keep its students enrolled until the successful completion of their academic programs [13]. This concept is closely related to academic persistence, which implies the continuity of students in their studies despite the challenges they may face [14]. Retention is a key indicator of educational quality and institutional commitment to student success, as it reflects the effectiveness of the strategies implemented to support students in their academic trajectory [3].

B. Student Desertion

Student dropout is the phenomenon whereby students abandon their studies before completing their academic program [15]. This phenomenon can be voluntary, when the student decides to leave his or her studies for personal, academic or economic reasons, or involuntary, when the institution makes the decision to withdraw the student due to low performance or non-compliance with requirements [6]. Attrition has negative implications both for students, who lose time and resources invested, and for institutions, whose reputation and efficiency are affected [16].

C. Determining Factors of University Attrition

College dropout is a multifactorial phenomenon influenced by a combination of academic, economic, social, technological and personal elements. Among the most prominent factors are

Academic Factors: These include low academic performance, lack of adaptation to the teaching methodology, dissatisfaction with the curriculum, and lack of pedagogical support [17].

Economic Factors: Lack of financial resources to cover the costs of tuition, materials and maintenance is one of the main causes of dropout, especially in contexts of economic vulnerability [18].

Social and Personal Factors: Family problems, work responsibilities, lack of balance between personal and academic life, and lack of social integration in the university environment [2, 19].

Technological Factors: In the distance mode, the lack of access to technological resources, the digital divide and difficulties in using virtual platforms are significant barriers [20, 21].

D. Strategic Retention Plan

It is a set of actions designed to identify, prevent and address the factors that contribute to student dropout, with the objective of increasing retention and graduation rates [2, 7, 22]. This plan is based on a comprehensive analysis of the causes of dropout and the implementation of specific strategies, such as:

Academic Accompaniment: Personalized tutoring, academic advising and leveling programs for students with difficulties [23, 24].

Emotional and Psychological Support: Psychological counseling services, stress management workshops and student wellness programs [25].

Strengthening of the Virtual Community: Creation of online social interaction spaces, study groups and support networks among students [26].

Improvement of Technological Infrastructure: Updating of learning platforms, provision of technological equipment and training in the use of digital tools [17].

Administrative Flexibilization: Simplification of procedures, flexible payment options, and early warning systems to identify at-risk students [27].

An effective strategic plan requires a comprehensive approach that involves all stakeholders in the educational community (students, teachers, administrative staff) and is continuously evaluated to adjust to the changing needs of students.

II. Methodology

This study adopts a mixed approach, of an explanatory sequential nature, which allows for a comprehensive analysis of the factors that influence dropout in the distance mode in Higher Education Institutions (HEIs) in Ecuador. The combination of quantitative and qualitative methods allows a deeper understanding of the phenomenon, integrating statistical data with perceptions of institutional actors.

A. Research Design

A sequential explanatory design was used, starting with a quantitative descriptive-correlational phase, followed by a qualitative in-depth phase. This strategy allowed us to first identify general patterns through structured surveys and, subsequently, to explore underlying causes through semi-structured interviews with key actors in the training process.

B. Population and Sample

The study was carried out at an Ecuadorian university that offers distance programs at the national level. The choice of this institution responds to its representativeness as one of the main referents of distance education in the country, with an enrollment of more than 3,800 students distributed in

different regions and academic programs. Although this is a case study, its scope allows us to reflect on common patterns in HEIs with similar characteristics.

The quantitative sample was selected by proportional stratified random sampling, considering variables such as career, gender and age group, in order to ensure an adequate representation of the diversity of the student body. A total of 349 students enrolled in distance mode were surveyed. The qualitative phase included six key informants (teachers, tutors and administrative staff of the student monitoring area), selected for their direct experience in monitoring and retention processes.a sequential explanatory design was used, starting with a descriptive-correlational quantitative phase, followed by an in-depth qualitative phase. This strategy allowed us to first identify general patterns through structured surveys and, subsequently, to explore underlying causes through semi-structured interviews with key actors in the training process.

C. Data Collection

Quantitative Phase: A structured survey was administered to the 349 students, designed to collect information on academic, economic, technological and personal factors that influence the decision to drop out of school. The survey included closed-ended questions and Likert scales to measure perceptions and attitudes.

The data were processed and analyzed using SPSS software (version 25), applying descriptive (frequencies, percentages) and inferential (correlation and regression analysis) statistical techniques.

Qualitative Phase: 6 semi-structured interviews were conducted with academic and administrative personnel of the IES. The interviews were focused on identifying the perceptions of the professionals on the causes of desertion and the retention strategies implemented. The interviews were recorded, transcribed and analyzed through thematic content analysis, using ATLAS.ti software to identify patterns and emerging categories.

Survey instruments: The questionnaire was validated through a pretest with 30 students, which allowed adjusting the clarity and relevance of the questions. The reliability of the instrument was measured by Cronbach's Alpha coefficient, obtaining a value of 0.87, indicating high internal consistency.

Interview guide: The interview guide was designed based on the preliminary findings of the quantitative phase and reviewed by experts in distance education to ensure its validity.

D. Data Analysis

Quantitative phase. A structured survey was applied and validated by pilot test with 30 students. The internal consistency was verified with Cronbach's alpha coefficient, obtaining a value of 0.87, which indicates high reliability. The data were processed with SPSS v25. Descriptive analyses (frequencies, percentages) and inferential tests were applied, particularly binary logistic regression analysis to identify significant predictors of dropout. The assumptions of independence of observations, multicollinearity and adequate sample size were previously verified. The significance level adopted was $p < 0.05$, and odds ratios were calculated to interpret the magnitude of the effects.

Qualitative phase. The semi-structured interviews were recorded, transcribed and analyzed by thematic content analysis using ATLAS.ti software. The emerging categories were related to the factors identified in the quantitative phase, thus facilitating a process of methodological triangulation that allowed contrasting and interpreting the findings from a holistic viewpoint.

This methodological integration seeks not only to quantitatively validate the attrition factors, but also to understand the institutional and subjective dynamics that influence student retention, thus strengthening the interpretative soundness of the study.

E. Ethical Considerations

The study complied with ethical research standards, obtaining informed consent from all participants. Data confidentiality and anonymity of respondents and interviewees were guaranteed.

III. Results

The results of the study are presented in two main sections: a quantitative analysis based on enrolment and survey data, and a qualitative analysis derived from interviews. The most relevant findings are detailed below.

A. Quantitative Analysis

1) Distribution of students by career and gender

During the academic period A-24 (April–July 2024), there were 3,835 students enrolled in distance mode, with a marked female predominance (63.94%) compared to males (36.06%). This pattern was especially visible in Early Childhood Education (99.13% female) and Basic Education (78.36%), suggesting a persistent feminization in the educational areas. In contrast, the Law career presented a more equal distribution (50.89% men and 49.11% women), showing a more balanced interest by gender. These differences reflect possible cultural and occupational influences on the choice of career, as well as the perception of the distance mode as a viable option for women with family or work responsibilities (Table 1).

Table 1. Students enrolled by degree program in the distance learning modality 2

Distance mode	Total # of students	Males	males (%)	Famales	famales(%)
Psychology	272	69	25.36	203	74.64
Initial Education	345	3	0.87	342	99.13
Accounting and Auditing	276	62	22.46	214	77.54
Business Administration	484	205	42.36	279	57.64
Basic Education	707	153	21.64	554	78.36
Law	1751	891	50.89	860	49.11
Total	**3835**	**1383**	**36.06**	**2452**	**63.94**

In terms of geographic distribution, the highest proportion of students came from the Sierra region (51.26%), followed

by the Oriente region (32.02%) and the Coast (16.72%). The lower participation from the Coast suggests the need to explore possible regional access barriers, such as poor connectivity or limited institutional diffusion in that area.

B. Geographical Distribution of Students by Gender

Table 2 illustrates the distribution of students by gender and region during the same academic period. The Sierra region concentrates the highest proportion of students (51.26%), followed by the Oriente region (32.02%) and the Costa region (16.72%). In all regions, there is a female predominance, with 63.94% of women compared to 36.06% of men. This disparity could reflect differences in access to higher education between genders, as well as the influence of cultural and socioeconomic factors in the choice of the distance mode.

Table 2. Segmentation of distance mode students by gender and region, 2024

REGION	COSTA	SIERRA	ORIENTE	TOTAL
Female	422	1147	883	2452
Male	219	819	345	1383
Total	641	1966	1228	3835

Fig. 1 confirms that the Sierra region maintains the highest proportion of students (51.26%), followed by the Oriente region (32.02%) and the Costa region (16.72%). This distribution suggests the need to implement strategies and policies to strengthen student participation in the Costa region, where enrollment is significantly lower. Investigating the factors that limit participation in this region could promote greater equity in access to higher education.

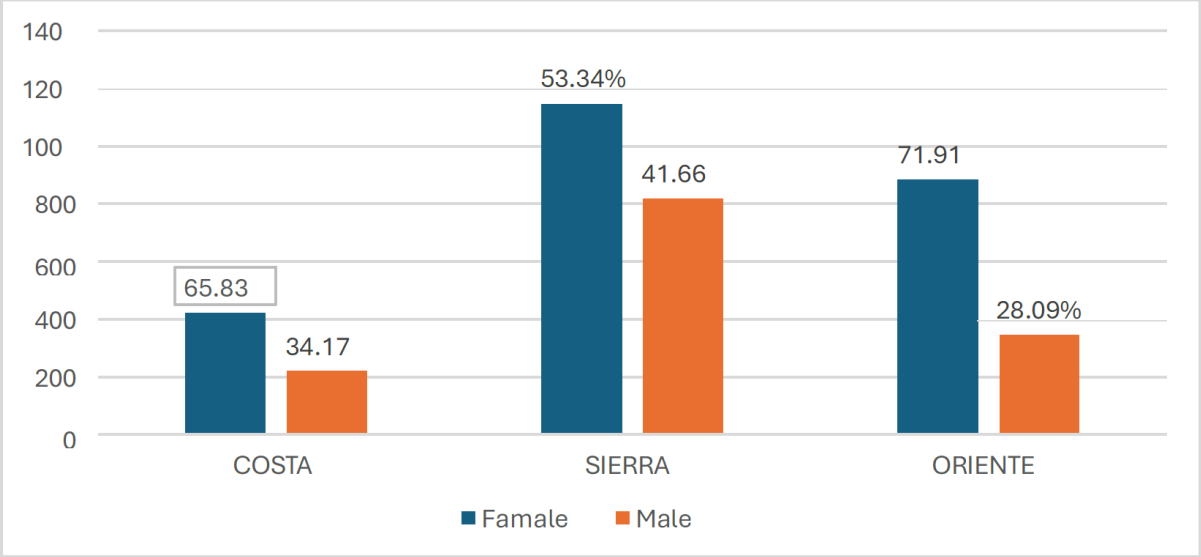

Fig. 1. Percentage of students by region period B23 (October 2023–February 2024).

C. Distribution of Students by Age and Gender

Table 3 presents the segmentation of distance learning students by age group during the period B23 (October 2023-February 2024). The predominant age among students is between 20 and 24 years old (42.39%), which indicates that a large part of the students in this modality are beginning their academic career. However, a significant percentage belong to the 25 to 29 (33.15%) and 30 to 34 (24.46%) age groups, which highlights the importance of offering retention strategies that meet the specific needs of young adults who combine studies with work or family obligations. Regarding marital status, 52.91% of students identify themselves as single, followed by 21.69% in the "other" category (possibly cohabiting), suggesting that the flexibility of the distance mode attracts people with diverse family structures.

Table 3. Segmentation of distance learning students by age period B23(October 2023–February 2024)

Edge	20–24 years	25–29 years	30–34 years	Total
Female	774 (42.43%)	624 (34.21%)	426 (23.36%)	1,824
Male	400 (42.33%)	294 (31.11%)	251 (26.56%)	945
Total	**1,174 (42.39%)**	**918 (33.15%)**	**677 (24.46%)**	**2,769**

D. Distribution of Students by Marital Status

Table 4. Segmentation of distance mode students by marital status, period B23 (October 2023–February 2024)

Marital Status	Total	Percentage
Single	2,029	52.91%
Married	627	16.35%
Other	832	21.69%
Divorced	164	4.28%
Unmarried	153	3.99%
Domestic Partnership	24	0.63%
Widowed	6	0.16%
Total	**3,835**	**100.00%**

Table 4 shows the distribution of students according to their marital status during period B23. The majority of students identify themselves as single (52.91%), followed by those classified in the "other" category (21.69%) and married (16.35%). This distribution reflects that the distance mode is particularly attractive to single students, possibly due to the flexibility it offers to combine studies with other responsibilities.

E. Application of Surveys by Career

To ensure the representativeness of the sample, stratified sampling was applied considering academic programs, study

levels and key demographic characteristics (e.g., age, gender). Table 5 details the distribution of the surveys applied by career and gender. The career with the highest participation was Law, representing 46% of the total number of surveys applied (160 surveys), followed by Basic Education (18%) and Business Administration (13%).

In terms of gender, a female predominance is observed in most of the careers, except in Law, where the distribution is almost equal (51% men and 49% women). This pattern is consistent with the enrollment data presented above.

Table 5. Survey application by career and gender, period B23 (October 2023–February 2024)

Career	% Participation	Total surveys	Males (%)	Females (%)
Psychology	7%	25	25%	75%
Initial Education	9%	31	1%	99%
Accounting and Auditing	7%	25	22%	78%
Business Administration	13%	44	42%	58%
Basic Education	18%	64	22%	78%
Law	46%	160	51%	49%
Total	**100%**	**349**		

F. Causes for Student Withdrawal in the Distance Learning Modality

Table 6 presents the main causes of student withdrawal in the distance mode during the period B23 (October 2023–February 2024). Of the 349 students surveyed, multiple causes for dropping out were identified. Economic factors were positioned as the most relevant, representing 34.09% of the cases (n = 119), followed by academic factors with 27.79% (n = 97). These include lack of adaptation to the virtual modality, difficulties with understanding the content and poor pedagogical support. Family factors (13.75%, n = 48) and domestic calamity situations (13.18%, n = 46) such as serious illness or death, also had a significant incidence.

Table 6. Causes for withdrawal of students in the distance learning modality period B 23

CAUSES FOR WITHDRAWAL		
Academic	97	27.79
Domestic calamity	46	13.18
Economic	119	34.09
Family	48	13.75
Vocation	10	2.86
No Cause	29	8.33
Total	**349**	**100.00**

Note: The first value represents the absolute frequency (number of students who mentioned that cause) and the second value represents the corresponding percentage of total respondents.

This distribution validates the hypothesis that economic and academic barriers are the main drivers of dropout in the distance mode, and correlates with findings in previous cohorts, as seen in Fig. 2.

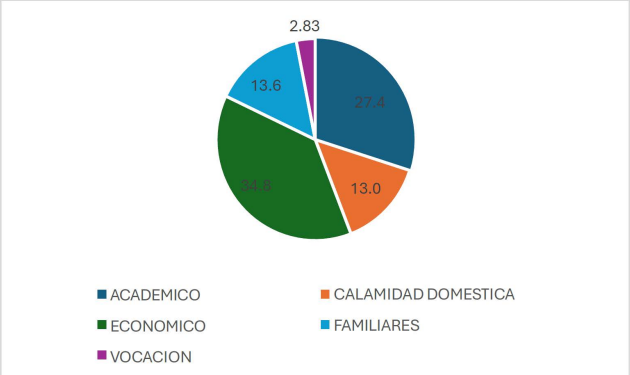

Fig. 2. Causes of withdrawal distance mode period A-24.

G. Reasons for Withdrawal in the Distance Learning Modality, Period A-24

Fig. 2 confirms that the main causes of withdrawal in period A-24 are consistent with those of period B23. Economic factors, such as lack of employment or insufficient income, continue to be the main barrier. In addition, academic problems were identified, such as lack of adaptation to the distance methodology and insufficient attention to students' informational needs. Other factors include domestic calamities (e.g., death of family members, high-risk pregnancies) and wrong career choice.

H. Retention Analysis by Cohort

Table 7 compares the number of students who entered the first level during period A20 with those who reached eighth level in period B23. When comparing the A-20 entry cohort with the students who reached eighth grade in B-23, a retention rate of 76.92% was obtained, with a loss of 23.08% (117 students). Again, economic (34.8%) and academic (27.4%) factors were the main causes of dropout. This data is consistent with the perceptions obtained in the qualitative interviews, and reaffirms the need for institutional policies aimed at academic accompaniment and financial support.

Table 7. Admission cutoff period A20 to B23

Distance learning careers	A20 First level	B23 Eighth Level
Business Administration	102	61
Law	294	200
Basic Education	82	94
Initial Education	29	35
Total	**507**	**390**

Note: The values on the left represent the absolute frequency of students who dropped out for each cause, while the values on the right indicate the percentage over the total number of dropouts registered in the cohort.

I. Variables Identified for the Interview

Table 8 summarizes the key variables explored in the semi-structured interviews conducted with the administrative staff of the Student Follow-up area. These variables include aspects such as vocation, academic, economic, family and social factors that influence students' decision to drop out of school. The questions are designed to inquire into the effectiveness of support services, academic infrastructure and retention strategies implemented by the institution.

Table 8. Variables identified for the interview

Variable	Question
Vocation	Is there a test to determine the professional profile in the careers?
Academic Factor	How does academic performance impact attrition?
Economic Factor	What financial support does the institution offer?
Family Factor	How do family problems affect attrition?
Social Factor	What initiatives promote social integration?

Source. Adapted from Puga and García (2022).

J. Analysis of Internal and External Factors

The MEFI (Matrix for the Evaluation of Internal Factors) and MEFE (Matrix for the Evaluation of External Factors) matrices allow the identification of strengths, weaknesses, opportunities and threats related to student retention.

Table 9. MEFI matrix (Internal Factors Evaluation Matrix)

Internal Key Factors	Weighting	Rating	Weighted Score
Development of an innovative learning ecosystem	0.12	4	0.48
Consolidation of an interdisciplinary system of knowledge and innovation.	0.10	4	0.40
Transformative impact on society through linkages	0.10	3	0.30
Efficient and sustainable management system	0.09	4	0.36
Challenges in student retention	0.10	3	0.30
Need to automate administrative processes	0.12	2	0.24
Gaps in teacher training for distance education	0.10	3	0.30
Limitations in internal financing capacity	0.08	2	0.16
Lack of consolidated strategies for internationalization	0.10	1	0.10
Development of an innovative learning ecosystem	0.09	2	0.18
Total	**1.00**	**2.92**	**Total**

The Internal Factors Evaluation Matrix (MEFI), in the Table 9, allows for the identification and analysis of strengths and weaknesses in relation to student retention in the distance learning modality. In this matrix, key aspects such as the consolidation of an innovative learning ecosystem, the impact of institutional management, the automation of administrative processes and the challenges in teacher training have been evaluated. Each factor has been weighted according to its relevance and rated according to its impact, allowing us to obtain a weighted score that reflects the internal situation of the university.

Table 10. MEFE matrix (Matrix for the Evaluation of External Factors)

External Key Factors	Weighting	Rating	Weighted Score
Growth of distance education and digitization	0.12	4	0.48
Advances in innovative teaching methodologies	0.10	4	0.40
External funding opportunities for universities	0.09	3	0.27
Increasing competition with other private and public universities	0.10	2	0.20
Change in government regulations and accreditation	0.08	2	0.16
Impact of the economic crisis on accessibility to education	0.10	1	0.10
Increased demand for automation in academic procedures	0.10	3	0.30
Expansion of educational internationalization	0.09	3	0.27
Increased labor market demands	0.10	2	0.20
Availability of scholarships and government subsidies	0.12	4	0.48
Total	**1.00**		**2.86**

The External Factors Evaluation Matrix (MEFE) in the Table 10, allows analyzing the impact of the environment on student retention in the distance learning modality at Indoamerica Technological University. Opportunities and threats related to the growth of distance education, advances in teaching methodologies, automation of procedures and changes in government regulations have been identified. The weighting and qualification of each factor allows establishing a strategic diagnosis of the institution's external environment. On the other hand, the MEFE Matrix shows that the environment presents favorable opportunities for the university, especially with the growth of distance education, digitalization and the availability of scholarships. However, there are significant threats such as increasing competition with other institutions, changes in government regulations and the impact of the economic crisis, which could affect student retention if adequate strategies are not implemented.

K. Strategic Timeline for Improving Retention

Table 11 presents a comprehensive strategic plan to improve student retention in the distance mode. This plan includes actions such as early identification of at-risk students, implementation of tutoring and mentoring programs, improvement of technological infrastructure and promotion of extracurricular activities.

Table 11. Strategic timeline to improve retention of higher education students in the distance mode at the Universidad Tecnológica Indoamérica

Objective	Actions	Responsible	Deadline	Measurement
Identify students at risk of dropping out	Implement data tracking and analysis systems	Academic coordinators and support staff	1 month	Number of students identified
Provide academic and emotional support	Create tutoring and mentoring programs	Professors and counselors	3 months	Number of sessions held

Encourage participation and commitment	Organize extracurricular activities and virtual events	Student welfare department	6 months	Participation rate
Improve technological infrastructure	Update learning platforms and digital resources	IT Team	2 months	Number of updates performed
Evaluate and adjust strategies	Conduct satisfaction surveys and feedback meetings	All involved	Continuous	Level of satisfaction and suggestions received
Develop mentoring programs	Assign mentors to new students	Faculty and advanced students	4 months	Number of mentor-mentee pairs
Promote student community	Create study groups and social networks	Student relations department	5 months	Number of active groups
Offer scholarships and financial aid	Identify and manage financial resources	Scholarship Office	6 months	Number of students benefited
Implement wellness programs	Offer mental and physical health workshops	Student welfare department	4 months	Number of participants
Encourage research and development	Create opportunities for research projects	Research Department	5 months	Number of projects initiated

The results reveal that economic and academic factors are the main barriers to student retention in the distance learning modality. The implementation of comprehensive strategies, such as tutoring programs, financial support, and improved technological infrastructure, is crucial to address these challenges. In addition, early identification of at-risk students and the promotion of an inclusive and flexible learning environment can contribute significantly to reducing dropout rates.

IV. Discussion

The results of this study confirm that dropout in distance higher education is a multifactorial phenomenon in which economic, academic, personal and technological determinants converge. These findings are consistent with previous studies conducted in Latin American contexts [3, 28], but also provide empirical evidence from Ecuador, a country where research on dropout in the distance mode is still incipient. Unlike models focused exclusively on individual factors, this study offers a systemic view that highlights the role of structural conditions and institutional design in student retention.

One of the most relevant findings is the primacy of economic factors as a cause of dropout (34.09%), which ratifies the findings of [2, 6], who warn that in contexts of vulnerability, the lack of resources for tuition, connectivity and materials has a direct impact on academic continuity. However, a distinctive contribution of this study is the identification of how these factors are intertwined with technological and institutional support barriers, especially in regions such as the Coast and the East, where infrastructure and digital access conditions are more limited. This territorial dimension is not usually addressed in sufficient depth in conventional retention models.

Regarding academic factors, the results show a high incidence (27.79%), mainly associated with the lack of adaptation to the virtual modality and deficiencies in pedagogical support. This coincides with [25] on the importance of adapting teaching methods to digital environments and strengthening personalized tutoring systems. However, the present study adds value by integrating these perceptions with qualitative data that reveal the disconnection between institutional offerings and the real needs of the student body, especially in terms of emotional support, academic guidance and sense of belonging.

An unexpected finding was the high proportion of women in distance education programs, which suggests that this population seeks to make family responsibilities compatible with their professional development. This trend, also observed in other Latin American HEIs [3], calls for a more flexible curriculum design and reconciliation policies that recognize gender dynamics and the use of time.

The cohort analysis established a retention rate of 76.92%, which, although consistent with the international ranges reported for distance education, shows a significant loss (23.08%) that could be reduced through early interventions. The integration of qualitative findings allowed us to identify that, beyond individual causes, there is weak articulation between academic, administrative and student welfare areas, which fragments institutional retention efforts.

At the institutional policy level, the results suggest that isolated strategies are not enough. A systemic intervention is required that includes actions such as the automation of administrative processes, the improvement of technological infrastructure, the implementation of emotional well-being programs, and the creation of virtual learning communities, as proposed by [7, 27]. In addition, this study raises the need to move towards predictive retention models based on artificial intelligence and learning analytics, as explored by [8], to anticipate risks and design personalized responses.

Overall, this research not only broadens the understanding of the phenomenon of dropout in distance higher education from a contextualized approach, but also proposes lines of action based on evidence that may be transferable to other HEIs with similar characteristics in Latin America.

V. Conclusions

This study identifies that the main causes of dropout in the distance learning modality are associated with economic, academic and personal factors. Economic factors emerge as the most significant barrier, as lack of financial stability and dependence on limited family income prevent many students from covering educational costs. This finding is consistent with previous research highlighting the impact of financial hardship on academic continuity.

In the academic setting, the lack of adaptation to virtual methodology and the insufficient availability of pedagogical support resources negatively affect student performance. These challenges underscore the need to strengthen academic leveling systems and offer personalized tutoring to help students overcome learning barriers in virtual environments. In addition, personal and family factors, such as child or dependent care responsibilities, also influence the decision to drop out of school. These results highlight the importance of

implementing flexible institutional policies that allow students to reconcile their personal responsibilities with their academic commitments.

To mitigate these problems and improve student retention, various strategies are proposed that include strengthening academic and emotional support. Implementing specialized tutoring and continuous training for teachers in methodologies adapted to virtual education can improve student performance and reduce the feeling of isolation. It is also recommended to make the schedules more flexible and consolidate support networks among students to create a more cohesive learning community. These measures can help students overcome the academic and personal challenges they face in distance education.

The automation of administrative processes and the optimization of student orientation and support services are essential to improve the student experience in the distance mode. The digitalization of documents and the implementation of a self-management portal will allow students to carry out procedures efficiently and without time restrictions. This will reduce bureaucracy and improve response times, making it easier for students to remain at the university. In addition, establishing a job bank and designing spaces for social integration will foster a sense of belonging and strengthen students' motivation, contributing to their permanence in distance education.

This study has some limitations. First, the data are based on a single institution, which limits the generalizability of the results. Future research could broaden the scope by including multiple institutions and geographic contexts. In addition, it would be valuable to explore in depth student perceptions of support services and their impact on retention. Finally, it is suggested to investigate the role of emerging technologies, such as artificial intelligence and adaptive learning, in reducing student dropout.

Conflicts of Interest

The authors declare no conflicts of interest.

Author Contributions

Conceptualization, T.M.M, A.N.N. and M.A.R.; methodology, T.M.M and A.N.N; software, A.C.Q.; validation, A.N.N., T.M.M. and A.C.Q.; formal analysis, M.A.R. and A.c.Q; investigation, A.N.N., M.A.R., and T.M.M.; resources, A.N.N.; data curation, A.N.N.; writing—original draft preparation, M.A.R and T.M.M.; writing—review and editing, A.N.N.; visualization, A.N.N.; supervision, A.N.N.; project administration, AN.N.; funding acquisition, T.M.M., A.N.N and M.A.R . All authors have read and agreed to the published version of the manuscript.

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