

Factors that Influence Undergraduate University Desertion According to Students Perspective

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Abstract—University desertion is defined as a withdrawal from the academic system that has a negative impact on the economic and social environment. Desertion is influenced by internal and external factors that affect students, institutions, and governments. A literature review shows empirical evidence concerning research conducted to solve the desertion problem. However, most of the studies we analyzed do not consider students' perceptions, which are a key factor in college dropout rates. For this reason, we propose some new factors that influence university desertion. These factors are supported by a study of 65 organizational and educational theories. To examine the influence of these factors, a case study was conducted with 3773 students at a public university in Ecuador. Logistic regression was used to determine the causal relationship between the identified factors and the students' university desertion. As a result, we established that when all the identified factors are present at the same time, the probability of a student deciding to drop out of college is 95% your paper to be published in the conference proceedings, you must use this document as both an instruction set and as a template into which you can type your own text. If your paper does not conform to the required format, you will be asked to fix it.

Keyword-Educational data mining, logistic regression, university desertion, desertion factors

I. INTRODUCTION

University desertion is a problem that affects most higher education institutions around the world. This topic generates controversy among administrators, professors, and students [1]. Today, high dropout rates are considered a possible deficiency of the undergraduate education system [2].

This can be seen from the academic and administrative indicators presented by management personnel at universities and higher education control agencies. In 2016, the dropout rate in India was 15.9% [3], while in Belgium, it was 26.9%; in the United States, the desertion rate for first and second year students was 44.8% [4], and in Costa Rica, it reached up to 49%. According to the United Nations (UN), the 2016 university desertion rate was 40% in several Latin-American countries, such as Colombia and Ecuador, and was approximately 54% in Brazil.

University desertion is influenced by a set of interacting factors that have a negative impact on students' decisions to drop out of college [5]. A literature review allows us to identify several studies related to factors that influence desertion. Nevertheless, these studies do not consider students' perspectives, which play a key role in university desertion. Consequently, the following study is based on organizational and educational theories and proposes 11 new factors that affect university desertion while taking students' perspectives into consideration. To examine the influence of these factors, an empirical study is performed with 3773 students.

This article is organized into six sections. In section two, the literature review is presented. The methodology applied in this research is described in section three. Sections four and five detail the experimental process and discuss the results, respectively. Finally, in section six, we state our conclusions.

II. LITERATURE REVIEW

University desertion can be defined as the cessation of an academic process and the non-completion of a formative process in higher education [6]. It is a problem that worries governments and has become a weakness in university education due to its high rates, which have negative effects on students and on the economic growth of societies [7]. Specifically, a university deserter is a student who has not exhibited academic activity for two consecutive semesters [6]. According to Stratton et al. [8], most studies related to university desertion indicate that once a student drops out of college, he/she will never resume his/her studies. Hence, university desertion is considered a permanent condition.

University desertion is multifactorial [9]. It comprises academic, personal, social, institutional and economic dimensions, as proposed by Sánchez [10]. These factors have a significant impact on the probability of desertion because, in many cases, they impose external restrictions on students that compromise their ability to complete their undergraduate studies [11]. The literature review presents empirical and theoretical evidence. Additionally, it aims to identify the factors that influence desertion. Tables I through V enumerate 112 factors that affect university desertion in students. These factors are classified into five dimensions.

TABLE I. Factors of the Personal Dimension

Factors	References
Adjustment	[12]
Age	[4],[5],[8],[15],[16],[17],[18],[19],[20],[21],[22],[23],[24],[25],[26],[27],[28],[29],[30],[31]
Change of goal	[12],[32]
Choice to change to current major	[24]
Country or city of origin	[13],[26],[33]
Domicile	[12],[16],[17],[18],[30],[34]
Encouragement and support of parents	[27]
Engagement of student	[5],[35],[36]
Engagement of student	[5],[35]
Ethnicity	[4],[13],[16],[17],[21],[22],[24],[25],[27],[28],[37],[38]
Gender	[5],[4],[15],[16],[17],[18],[20],[21],[22],[23],[24],[25],[26],[31],[33],[34],[39],[40],[42],[43],[44],[45],[46]
Has a computer	[25]
Health problem	[32]
Interest level in current major	[24]
Intrinsic motivation	[36],[47]
Leadership	[45]
Level on commitment	[48]
Living on campus	[22]
Loneliness	[49]
Marital status	[8],[25],[26],[39],[44],[55]
Measure of student persistence	[50]
Pessimism	[19],[46]
Residency	[17],[22],[43]
Self-efficacy	[15],[33],[36],[47]
Student satisfaction	[18],[32],[49],[51]
Tuition fee source	[17]
Vocational involvement	[52]
Work experience	[43]
Year of birth	[41]

TABLE II. Factors of the Institutional Dimension

Factors	References
Campus environment	[12]
High school type	[13]
Institutional involvement	[14]
Infrastructure of university	[12]

TABLE III. Factors of the Economic Dimension

Factor	Reference
Awarded scholarship	[33],[37],[55]
Below poverty line	[39]
Campus employment	[22]
Dependency	[27]
Fall student loan	[37]
Family income	[25]
Father`s job	[56]
Financial concerns	[36],[38]
Financial need	[55]
Investment	[48]
Loan received	[37],[55],[60]
Student employment status	[45]
Student fee status	[29]
Type of financial assistance	[24],[37],[42],[60]

TABLE IIIV. Factors of the Academic Dimension

Factors	References
Absenteeism	[45]
Academic ability	[17], [30]
Academic overload	[30]
Academic performance	[31], [53], [55]
Age at admission	[54]
Average formative assessment result	[17]
Best test score GPA, SAT	[4], [13], [18], [21], [22], [24], [34], [35], [37], [38], [48], [49], [50], [55], [56], [57], [58],[59], [60]
Cohort	[4],[16], [28],[40]
Curricular involvement	[25]
Degree	[16], [21], [41], [44], [55], [60]
Degree aspiration	[38]
Degree program length	[29]
Educational goal	[5]
English language literacy	[43]
Enrolled in another institution	[32]
Entry qualifications	[16], [50]
Experience	[15], [16]
Final examination test	[17], [45], [54], [58], [61],[62]
First and second midterm exam grades	[54]
First semester credit load	[22]
Number quiz	[54]
Participate in extracurricular activities	[12],[32]
Points from secondary school	[24],[44],[45]
Progression outcome	[16]
Readiness	[15]
Recognized credits	[17],[26],[53]
Resource use	[52]
Satisfaction with major	[12]
Score of academic integration	[21],[54],[60]

Scores	[26],[27],[31],[33],[42],[54]
Self-evaluation	[25],[45]

TABLE V. Factors of the Social Dimension

Factors	References
Campus accommodation	[27],[29],[38]
Belonging to a marginalized or vulnerable section of society	[28],[39]
College status	[18]
Community support	[45]
Employment status	[24],[25],[39],[41]
Family problems	[12]
Father's education level	[5],[21],[25],[26],[44],[56]
Means of transportation	[25]
Migrated before	[5],[40]
Mother completed junior year	[40]
Mother's education level	[5],[21],[25],[31],[44],[45],[56]
Occupation	[4],[26]
Parent occupation	[32]
Political status	[17]
Social status	[20],[26],[27],[29],[44],[52]

III. NEWLY IDENTIFIED FACTORS

The set of new factors was built based on the literature review, 65 organizational theories, 12 educational theories and logical reasoning. As a result, 11 factors were obtained, which are described as follows:

F1: limited knowledge about specialized software usage in the university major refers to the student's ability to use specialized software for academic purposes. This type of software is designed with the goal of improving students' knowledge via the application of technology. It is not related to didactic multimedia material, virtual environments, the internet, blogs, wikis, forums, chat rooms, or messaging services. It is important to analyze the influence of this factor because students need to have adequate knowledge in the use of technologies that are applied in the process of their university education.

Software usage applied to the teaching process facilitates understanding and is often needed for specialized fields. For example, in the context of a computer science degree, the usage of technology such as PHP, Java, SQL, and MySQL is necessary for the development of information systems. If a student cannot use subject-specific technology as part of the academic training process, he/she may lose motivation, stop attending academic activities and lose control of his/her grades and learning in that subject.

On the other hand, when a student is motivated, he/she will show an interest in learning and in activities that foster academic development (theory of motivation [63]).

Hypothesis H1: *limited knowledge about the usage of specialized software in an undergraduate degree program influences university desertion.*

F2:planned and unplanned pregnancy refers to the gestational process of a student during a university academic period. During adolescence, pregnancy is considered a biomedical problem with a high risk of complications [64]. Moreover, it has socio-cultural and psychological implications that affect the student at the personal, educational, family and social levels [65].

Most pregnant students are forced to drop out of college, which limits their study and work opportunities and endangers their living conditions. Young parenthood, especially in the teenage years, generates multiple disadvantages in terms of the achievement of academic objectives [66]. This problem is accentuated in universities due to higher academic requirements that demand more attention.

Hypothesis H2: *planned and unplanned pregnancy influences university desertion.*

F3: teacher's commitment to the student refers to the principles a teacher expresses for the academic and human development of the students. An understanding of teaching competencies communicates the student's potential to engage in the teacher's work with initiative, flexibility, and autonomy [67]. This factor is relevant to students' university desertion because the integration of knowledge, abilities, motivation, and values, when expressed through effective teaching, ethics and social commitment, motivates students to continue their studies. Tutoring and mentoring programs at universities acknowledge the importance of this factor in reducing dropout rates. Furthermore, competent professionals who possess knowledge and abilities that enable successful performances in their specific disciplines (Gestalt theory [68]) will also empower human and academic development in their students. They motivate them to reach favorable outcomes in terms of university completion.

Hypothesis H3: *the teacher's commitment to the student influences university desertion.*

F4: a first-born son's financial commitment to his family refers to an obligation acquired by the eldest son in a family when he assumes financial responsibility for the family due to his father's absence [69]. This factor is relevant to university desertion because the order of birth among children affects their academic development as students [70].

This is especially true when older children need to drop out of their university studies to work and financially support their siblings. It should be noted that people feel motivated when they satisfy their highest-priority needs before pursuing professional growth (Maslow's theory [71]). Consequently, if a student does not attend to basic family needs such as housing, health, and food, he will not be motivated to continue his undergraduate education and will decide to drop out of college.

Hypothesis H4: *a first-born son's financial commitment to his family influences university desertion.*

F5: bullying refers to an aggressive behavior pattern among students that involves repeated unwanted, negative actions [72]. This type of abuse constitutes physical and psychological persecution [73]. If a student is abused physically and emotionally, his/her learning process will be affected. This problem is widely studied at the high school level. However, it also causes major difficulties at universities because most students live alone without the care and protection of their parents, which makes it impossible for them to access early help to resolve the aggression.

Social ostracism and the necessity of leaving a hostile environment can lead to university desertion in students. Additionally, continued abusive relationships have negative effects on the victims, such as lack of self-esteem, anxiety and even depression (personality theory [74]).

Hypothesis H5: *bullying influences university desertion.*

F6: sexism refers to an attitude or way of thinking that considers men superior by nature to women or vice versa [75]. This factor is relevant to university desertion because sexist behavior among students can cause differences in gender roles.

This is especially true for university majors in which the female student population is significantly higher than the male student population or vice versa. As a result, negative relationships in the students' social environment can provoke the degradation of self-image for men and women on a social and academic level (based on the theory of socialization).

Hypothesis H6: *sexism influences university desertion.*

F7: student's acquired addictions refers to negative behaviors that are socially accepted among students. They have the common characteristic of providing immediate gratification; some examples are social networks, drugs, and video games. Addictions can occur when students are unable to maintain their relationships with friends or relatives during their professional training.

This situation provokes isolation and a sense of tedium that trigger an addiction to something. Human beings feel a deep need to establish relationships and connections (modeling and induction theory of mind, [76]). When the relationship between the student and the addiction is constant, it becomes problematic. In this situation, the student prioritizes the addictive activity instead of his/her academic obligations.

Hypothesis H7: *students' addictions influence university desertion.*

F8: students' number of children refers to the number of children students have during their university training. Fertility and reproduction among high school students is a constant problem that is closely connected to the desertion of the education system [77] because students with children need to spend time taking care of them and finding a way to financially support their family to meet basic needs for their children's welfare.

This problem is exacerbated in the university context because students have strict study schedules, which require more responsibility and time commitment to advance academically.

Hypothesis H8: *the number of children that students have influences university desertion.*

F9: students' adaptation to university learning methodologies refers to the degree of adjustment a university student experiences in relation to the change in learning methods applied by teachers in the university context compared with the methods applied at the high school level. It is relevant to university desertion because university students have to be able to manage their knowledge, keep updated in terms of academic content, and select appropriate situations to develop professionally and adapt to changes.

Hypothesis H9: *the students' adaptation to university learning methodologies influences university desertion.*

F10: major or institution ranking refers to the position of a university or major in relation to other institutions or major. University rankings are presented in lists compiled by groups of institutions and are determined by indicators of quality [78]. This type of classification may have an impact on the university's prestige and influence the number of students enrolled and their quality [79].

If a student perceives his/her university to be prestigious, this perception will increase his/her interest in staying at the university due to the possible increase in job opportunities, social status, academic benefits and student wellness. On the other hand, if students' interest decreases, they may leave the university and enroll at more suitable institutions.

Hypothesis H10: *major and institution rankings influence university desertion.*

F11: students' perspectives on their integration into the labor market refers to students' perceptions of the training and academic resources provided by the university to integrate students into the labor market. There is a close relationship between higher education and the employment world because universities provide students with knowledge, abilities, and competencies that increase their individual capacities to obtain jobs [80].

The link between education and employment can generate a positive or negative impact on students. It is believed that a higher education level results in greater success in the workforce, which leads to a better economic status and a higher level of social influence [81].

Hypothesis H11: *students' perspectives on their integration into the labor market influence university desertion.*

The model for determining new desertion factors includes a set of eleven factors that could be causes of university desertion (see Table VI and Fig. 1).

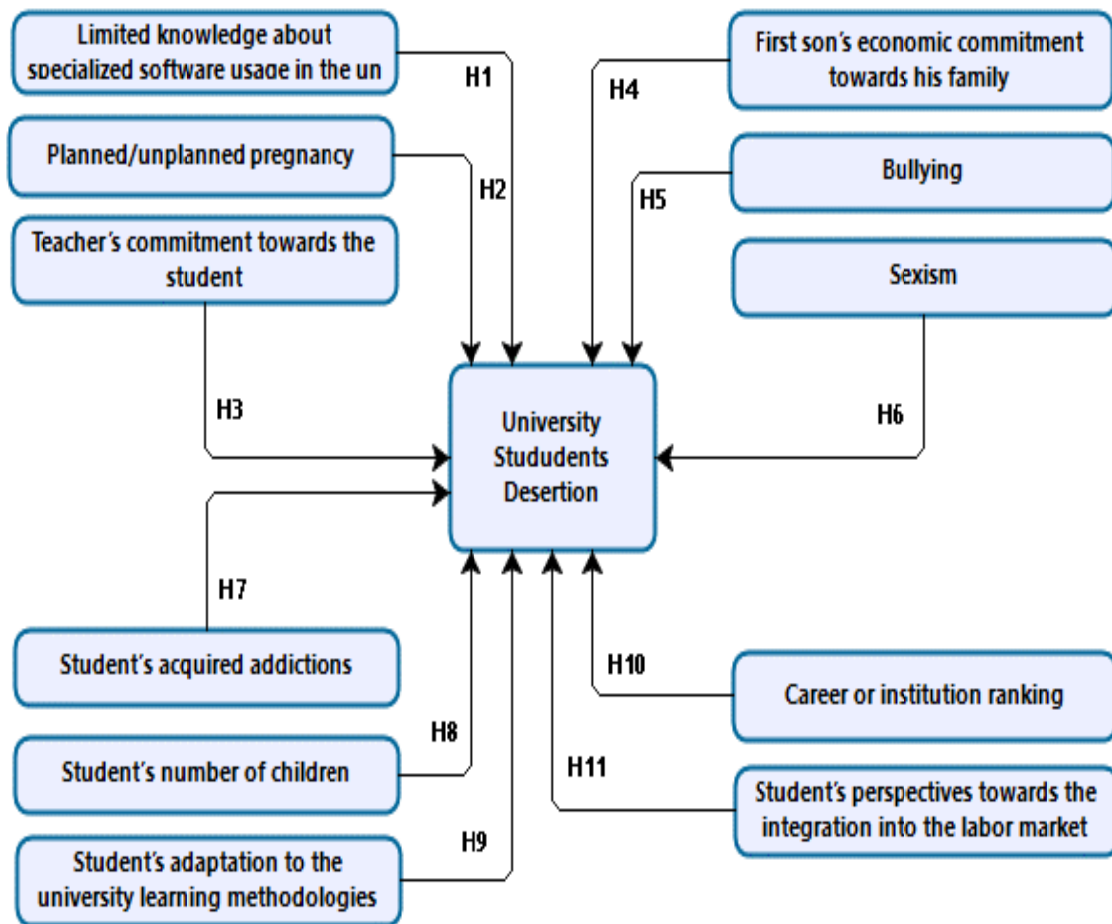


Fig. 1. Conceptual Model

TABLE IV. Newly Identified Factors in University Deserition

ID	Factor	Description	Source
F01	Limited knowledge about specialized software usage in the university major	Student's ability to use specialized software for academic purposes	Theory of motivation [63]
F02	Planned and unplanned pregnancy	Student's gestation process during her university education	[64,66]
F03	Teacher's commitment to the student	Set of principles that the teacher expresses for the academic and human development of the students	Gestalt theory [68]
F04	First-born son's financial commitment to his family	The obligation acquired by the oldest son in a family due to the father's absence. He takes on financial responsibility for the household [69]	Maslow's theory [71]
F05	Bullying	Physical, verbal and psychological aggression with the intent of harming another person [72]	Personality theory [74]
F06	Sexism	Attitude or way of thinking that affirms that men are by nature superior to women or that women are by nature superior to men [75]	[75]
F07	Students' acquired addictions	Student behaviors that are socially accepted and have the common characteristic of providing immediate gratification, such as social networking, drugs, or video games.	[76]
F08	Student's number of children	Number of children a student has during his/her university education.	[77]
F09	Student's adaptation to the university learning	Level of adjustment a university student has to changes in the learning methods applied by the teachers in a university context which are different from the ones applied in high school	
F10	Major or institution ranking	Position of a university or major in relation to other universities or majors [78].	[79]
F11	Student's perspective on his or her integration into the labor market	Idea or projection a student has about the learning and academic resources provided by the university toward integration into the workforce	[80,81]

IV. METHOD

A. Information Gathering

A survey was administered using Google Forms for more than three months, starting in June until October 2017. The survey was offered to undergraduate students in the public's universities in, Ecuador who had enrolled between March 2012 and October 2017. A total of 3773 students answered the survey.

The survey's objective was to determine the students' points of view regarding the possible causes of university deserition. The survey consisted of 3 sections. Section 1 collected information related to the institution and characterizations of the students (10 questions), section 2 contained questions about the factors that influence deserition (13 questions), and section 3 contained additional questions to complement the study (7 questions).

The results for section 2 were evaluated using a Likert scale of 5 points, which are as follows: 1: not influential, 2: slightly influential, 3: moderately influential, 4: highly influential, and 5: totally influential. To validate the survey questions, two pilot tests were established. The first was directed at people with experience in topics related to university deserition and was administered to a sample of 200 students. The objective was to verify arelationship between the questions and the hypotheses. As a result of this test, the wording of the original survey was corrected and the questions were rewritten using simple language that could be easily understood by the students.

B. Information Analysis

This step is structured in three stages:

1. A descriptive analysis of the population is used to determine the demographic characteristics of the students.
2. Reliability testing and questionnaire validation. Cronbach’s alpha was used to determine the internal consistency of the instrument and to ensure that the items measured using the Likert scale are highly correlated.
3. Data modelling using logistic regression based on the Box-Jenkins method.

V. RESULTS AND DISCUSSION

A. Descriptive Analysis of the Population

Table VII displays a summary of the demographic characteristics for students enrolled in at public universities in Ecuador.

TABLE VIV. Descriptive Statistics

Variable	Description	Value	Percentage
Gender	Male	1745	46.25%
	Female	2028	53.75%
Age Range	Age < 20	2171	57.54%
	Age 21-28	1494	39.60%
	Age > 29	108	2.86%
Marital Status	Married	521	13.81%
	Divorced	33	0.87%
	Single	3032	80.36%
	Non-married partnership	187	4.96%
Ethnicity	Afro descendant	6	0.16%
	White	19	0.50%
	Indigenous	142	3.76%
	Mestizo	3581	94.91%
	Montubio	11	0.29%
	Mulatto	13	0.34%
Has a Job	No	2763	73.23%
	Yes	1010	26.77%
Type of Household	Mother and siblings	599	15.88%
	Father and siblings	750	19.88%
	Father, mother, and siblings	1926	51.05%
	Spouse and children	303	8.03%
	Other relatives	195	5.17%
Father’s education level	None	362	9.59%
	Elementary	1816	48.13%
	High school	1147	30.40%
	University	448	11.87%
Mother’s education level	None	336	8.91%
	Elementary	1889	50.07%
	High school	1177	31.20%
	University	371	9.83%

The information corresponds to panel data; information for students pursuing graduate degrees was not considered.

The results obtained from this socio-economic inquiry allows determining significant differences in the used data for the study. For example, the female population is higher, students often come from households where their father or mother is absent or live with other relatives, the predominant education level of the students’ parents elementary school and a high percentage of students work while pursuing university degrees.

B. Data Reliability

Cronbach’s alpha coefficient was utilized. The variance method was utilized to determine the internal consistency index for the survey. The results were obtained using SPSS, and the value calculated was 0.908, which indicates that the questionnaire was reliable.

TABLE VVIII. Survey’s Validity Result

Reliability statistics	
Cronbach’s alpha	Number of elements
.908	37

On the other hand, Table IX shows the Likert scale results for the survey given to the students regarding factors that influence university desertion. To analyze the answers, a mean value was established for the scores. Using the visual grouping method, between 1 and 5 interval cut points were obtained, which allowed the establishment of upper limits for the ranges.

TABLE VIIX. Results of the Likert Scale Evaluation

Scale	Frequency	%	% Valid	% Cumulative
Low influence	14	0.4	0.4	0.4
Medium influence	110	3.5	3.5	3.9
High influence	1116	25.5	25.5	29.4
Total influence	2533	70.6	70.6	100.0
Total	3773	100.0	100.0	

Table X shows the calculation of the measures of central tendency, namely the median, mode and standard deviation, for the students’ answers on their perceptions of desertion at higher education institutions. The mean, which is >4, indicates that there is a high correlation among the students’ answers regarding desertion.

C. Data Modelling

To build the model, we utilized the Box-Jenkins method proposed by Gujarati & Porter [82]. It comprises 4 stages: identification, estimation, verification, and forecasting. They are described below.

TABLE X. Measures of Central Tendency for Perceptions of University Desertion

Hypothesis	Mean	Mode	Desv.tip
H1	4.27	5	0.889
H2	4.28	5	1.004
H3	4.17	5	1.085
H4	4.35	5	1.042
H5	4.02	4	0.914
H6	4.03	4	1.022
H7	4.05	4	0.892
H8	4.25	5	1.078
H9	4.24	5	1.173
H10	4.21	5	1.138
H11	4.33	5	0.991

Specification: the model has an independent variable vector $X = (F_1, F_2 \dots F_n)$ consisting of the factors that are considered to influence the Y result (desertion). We then use equation (1) proposed by Ibarra [83]:

$$P(y = 1 | x) = \frac{e^{B_o + Bix}}{1 + e^{B_o + Bix}}$$

Where:

B_o = independent term

P = probability of an event

Y = dependent variable

X = independent variables (F)

Bix = combination of the independent variables

Estimate: at this stage, the significance coefficients and correlation factors are estimated and presented in Table 10. Logistic regression was used because it is a non-linear parameter estimation method. It allows the prediction of probabilities given certain characteristics of the independent variables [83].

One of the characteristics of the logistic model is that the dependent variables should contain binary data; this means that the model can have two possible results:

Y=1: High probability of influence for the identified desertion factors.

Y=0: Low probability of influence for the identified desertion factors.

The software program Eviews was used to determine the influence of the identified factors in university desertion. The results of the logistic regression model are presented in equation (2):

$$Y = 1 - @CLOGISTIC(-(0.818043 * F1 + 0.629028 * F2 - 0.390826 * F3 + 0.380309 * F4 - 0.809717 * F5 + 0.852620 * F6 + 0.687710 * F7 + 1.384878 * F8 + 0.281206 * F9 + 0.637297 * F10 + 1.346561 * F11 - 4.819381)) \quad (2)$$

Table XI displays the behavior of each factor and its positive (+) or negative (-) correlation with desertion. The value $P(Y=1) = 0.5$ served as critical point. The advantage of this method is that the hypothesis can be verified easily. The results show that the identified factors are statistically significant because the p-value is < 0.05. Consequently, these factors influence university student desertion.

Testing: after the parameter evaluation, it is important to conduct validation tests on the results to verify the quality of the sample information and the data stability within the specified model. At this stage, it is essential to point out whether divergences exist in the hypotheses since this may indicate an incorrect model specification.

TABLE XI. Significance Coefficients of the Factors

Variable	Coefficient	Std. Error	z-Statistic	P-value
C	-4.819.381	0.356954	1.350.141	0.00000
F1	0.818043	0.187763	4.356.790	0.00000
F2	0.629028	0.180224	3.490.262	0.00050
F3	-0.390826	0.139217	2.807.320	0.00400
F4	0.380309	0.172667	2.202.562	0.02760
F5	0.809717	0.181720	4.455.839	0.00000
F6	0.852620	0.152875	5.577.225	0.00000
F7	0.687710	0.150909	4.557.112	0.00000
F8	1.384.878	0.160912	8.606.428	0.00000
F9	0.281206	0.135480	2.075.625	0.03790
F10	0.637297	0.143733	4.433.882	0.00000
F11	1.346.561	0.202286	6.656.711	0.00000

The OLS residues exhibited positive values above 0 and below 1. These values validate $0 < E(Y_i | X_i) \leq 1$ and verify one of the principles of the logistic model (see Fig. 2).

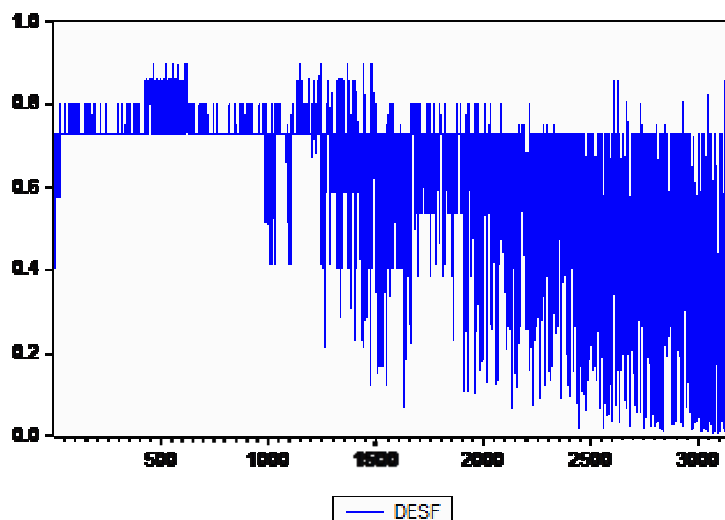


Fig. 2. OLS residues of the logistic regression model

The global contrast of the model was evaluated using the Pseudo-R² McFadden index. The value of this statistic should be between 0 and 0.5. The value we obtained from the model was 0.0133457, which confirms that the model is statistically significant.

On the other hand, Hosmer-Lemeshow tests were used to compare the predictions of the probabilities for the observed data. These tests help in determining if a model accurately describes the data and are based on the following hypotheses:

- Ha₀ = the model represents a good data fit;
- Ha₁ = the model does not represent a good data fit.

TABLE XII. Hosmer-Lemeshow Tests

Goodness-of-Fit Evaluation for Binary Specification			
Andrews and Hosmer-Lemeshow Tests			
Grouping based on predicted risk (randomized ties)			
H-L Statistic	2.86	Prob. Chi-Sq(8)	0.000
Andrews Statistic	4.310	Prob. Chi-Sq(10)	0.000

For Canary [84], the Hosmer-Lemeshow statistic indicates poor model adjustment if the significance value is greater than 0.15. According to our results, the alternative hypothesis (Ha₁) should be rejected and the null hypothesis (Ha₀) accepted because Chi-Sq = 0.000. Hence, the proposed model provides a good data fit and the variable (X) of the model adequately estimates the probabilities. Wald's test was used to verify the significance level and the estimates of the model parameter coefficients based on the following hypotheses:

- Hb₀ = X does not influence desertion
- Hb₁ = X influences desertion

TABLE XIII. Wald's Test

Wald's Test:			
Equation: Logistic Model			
Test Statistic	Value	Df	P-value
F-statistic	3.030.830	(11, 3150)	0.000
Chi-square	3.333.913	11	0.000
Null Hypothesis: C(1)=C(2)=C(3)=C(4)=C(5)=C(6)=C(7)=C(8)=C(9)=C(10)=C(11)=0			

Since the p-value is < 0.05 , H_0 is rejected. Therefore, all the newly identified factors influence university desertion. To determine the probability of university desertion, an estimate of Y was calculated using the coefficients of maximum likelihood estimation, as shown in Table XIV. Additionally, a simulation process for the proposed model was generated using estimated (β) values, the X values and the estimated Y values. For the variable X, entry values of 1 to 3 were used. For example, for the factor 1, we used X=1 (1 child), X2 = (2 children) and X=3 (3 children).

Since the logistic model is specified as Y (estimated) = $\ln(p/1-p)$ and the probability $(P) = \text{Exp}(Y \text{ estimated}) / [1 + \text{Exp}(Y \text{ estimated})]$, the coefficients (β) equal the logarithm of the probability. To calculate the antilogarithm or $\text{Exp}(\beta) = P/(1-P)$, we obtain the coefficients. Thus, increases in (β) led to increases in the probability of university desertion.

The results obtained in the present study confirmed that the identified factors are statistically significant at a confidence level of 95% and a p-value of 0.05%. Therefore, all of the newly identified factors influence university desertion.

TABLE XIV. Probabilities of Student University Desertion

Factor	(β)	Valor	Y(estimate)	P
F1	0.818043	X=1	0.8180	69%
		X=2	1.6360	84%
		X=3	2.2660	92%
F2	0.629028	X=1	0.6290	65%
		X=2	1.2580	78%
		X=3	1.8757	87%
F3	-0.629028	X=1	0.6290	40%
		X=2	1.2580	31%
		X=3	1.8870	24%
F4	0.380309	X=1	0.3803	59%
		X=2	0.6814	68%
		X=3	1.1409	76%
F5	0.809717	X=1	0.8097	69%
		X=2	1.6194	83%
		X=3	2.4291	92%
F6	0.852620	X=1	0.8526	70%
		X=2	1.7052	85%
		X=3	2.5578	93%
F7	0.687710	X=1	0.6877	67%
		X=2	1.3754	80%
		X=3	2.0631	89%
F8	1.384878	X=1	0.9999	73%
		X=2	1.9980	88%
		X=3	2.9970	95%
F9	0.281206	X=1	0.2812	57%
		X=2	0.5624	64%
		X=3	0.8436	70%
F10	0.637297	X=1	0.6372	65%
		X=2	1.2745	78%
		X=3	0.8712	87%
F11	1.346561	X=1	0.9990	73%
		X=2	1.9980	88%
		X=3	2.9970	95%

Fig. 2. Desertion probability when X=1

The estimation results displayed in Figure 3 show that high coefficient values (β) are related to high desertion probabilities. The Y estimates indicate that there is a causal relationship between the identified factors and university desertion. The proposed simulation model indicates that there is a 57% probability of university desertion. Factors such as **number of students' children (F8)** and **students' perspectives on their integration into the labor market (F11)** present higher probabilities of desertion. For the factor **number of students' children**, the value (β)=1 indicates that an increase in the number of students' children during university attendance increases the desertion probability. Thus, if a student has one child, the desertion probability is 73%.

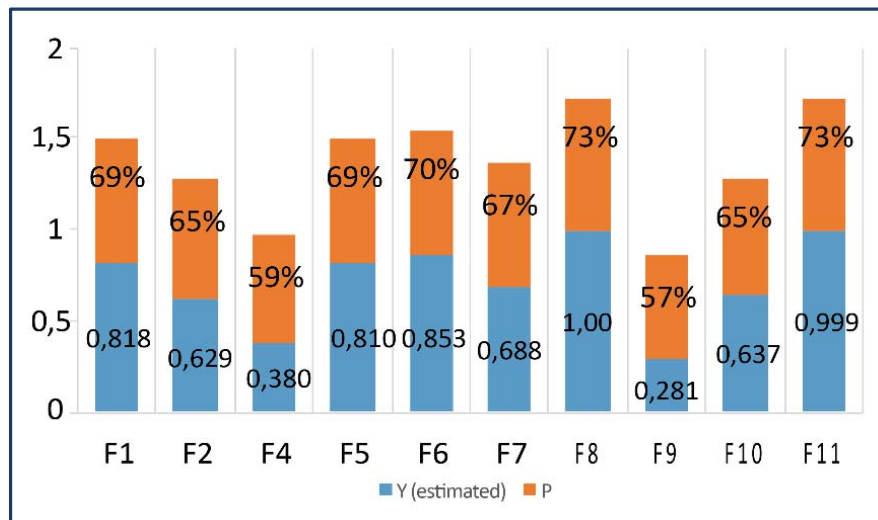


Fig. 3. Desertion probability when X=1

The high influence of this factor in this model is explained by the fact that 53% of the students who answered this question were women and most respondents reported having at least one child. Therefore, the presence of children can generate lifestyle changes that reduce the probability of students successfully finishing their undergraduate studies.

The results for the factor **students' perspectives on their integration into the labor market (F11)** indicate a desertion probability of 73%. One of the main objectives for the universities is to strengthen academic competencies that enable the development of professional capabilities so that students can integrate into the workforce. If a student believes that his/her university training is not contributing to his/her job prospects, he/she will find other higher education institutions that offer more suitable academic, technological and social facilities in terms of fulfilling work-related expectations.

On the other hand, Figure 4 shows that an increase in the estimate of Y (when X=3) generates an increase in the desertion probability. When the factors are individually activated, the value of *minimum probability* is 70%, while the *maximum probability* goes up to 95%. Hence, there is a significant causal relationship between each of the identified factors and university desertion. Figure 5 shows that the factor of **teacher's commitment to the student (F3)** exhibits a negative value (β). The results indicate that there is an inverse relationship between the constant and the factor. Hence, a decrease in the teacher's commitment to the students' academic and personal development increases the desertion probability by up to 40%.

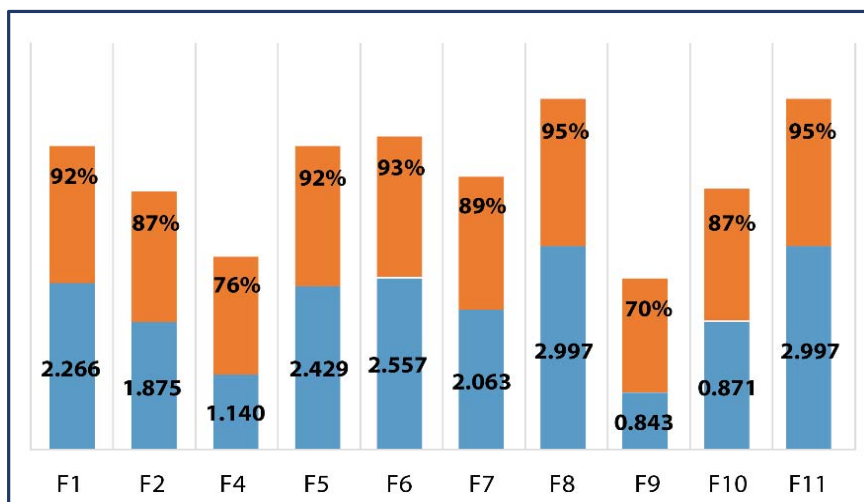


Fig. 4. Desertion probability when X=3

Finally, when all the factors are activated at once with the smaller value (X=1), the probability of a student opting to drop out of the university is 95%, this shows the importance of the identified factors proposed in this study.

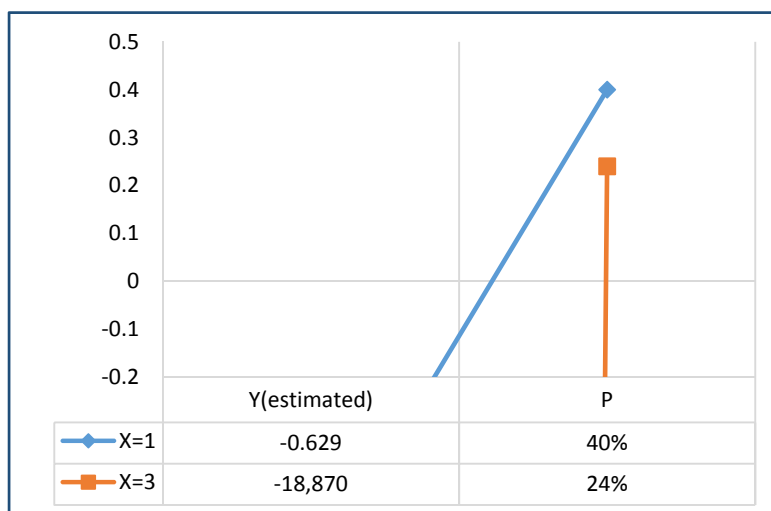


Fig. 5. Factor with negative value (β)

VI. CONCLUSIONS

University desertion is influenced by various factors that negatively affect students' decisions to drop out of college. Taking this into consideration, the objective of the present work was to estimate the degree of influence for the factors of limited knowledge about specialized software usage in the university major, planned and unplanned pregnancy, teacher's commitment to the student, first-born son's financial commitment to his family, bullying, sexism, students' acquired addictions, students' numbers of children, students' adaptation to university learning methodologies, major or institution ranking, and students' perspectives on their integration into the labor market have on university desertion. Based on the methodology we applied, these 11 newly identified factors have a strong causal relationship with desertion. The results presented in this paper provide valuable information for decision-makers in higher education institutions.

Considering that most of the identified factors correspond to the students' personal circumstances, it is necessary to establish strategies that encourage links between students and universities that can increase students' welfare. With these strategies, students will have better chances of finishing their undergraduate studies, thereby reducing university desertion rates.

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