







Dropping out of higher education: Analysis of variables that characterise students who interrupt their studies

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ABSTRACT

One of the persistent problems faced by the university education system is the dropout rate. The main aim of this research was to identify the profile characteristics of those students who drop out of their studies, seeking in-depth knowledge of the reality behind the issue. The responses to a questionnaire of 149,837 students from three Spanish universities (La Laguna, Zaragoza and Huelva) who had dropped out of their undergraduate studies were analysed. The outcomes enabled us to identify a number of features associated with the likelihood of dropping out of university studies. Specifically, it was found that the university of study, sex, age, study branch, entry qualification, scholarship or grant, nationality and job are predictors of dropout. The results obtained have an important transfer value, with a view to implementing actions for the adaptation of students and to avoid university dropout.

1. Introduction

When analysing different parameters for assessing the quality of higher education, the number of students who drop out of education and the causes behind this issue are aspects that receive a lot of attention (Gallego et al., 2021). Reducing university dropout rates and improving student retention has therefore become one of the major challenges facing university institutions each year (De la Cruz-Campos et al., 2023; Lizarte & Gijón, 2022; Matta et al., 2017; Pusztai et al., 2022). Rather than competing with other institutions, the problem that universities must solve concerns finding a way to avoid losing a significant percentage of students who give up their studies before completion. Although the international literature provides various conceptualisations (Bäulke et al., 2021), in this study, dropout is understood as the situation of students who, after enrolling for the first time in a degree programme, do not renew their enrolment for the following two years, leaving the university definitively (Kehm et al., 2019).

As stated by Parra-Sánchez et al. (2023), dropping out of university should certainly be seen as a global phenomenon, occurring worldwide.

This is confirmed in research such as that by Freitas et al. (2022, p.8) or Álvarez (2021), who noted that academic “dropout is a very relevant phenomenon” in different continents, the consequences of which are felt not only in academic contexts, but also in society at large (Ahn & Davis, 2020). According to the OECD (2016), countries such as Hungary, New Zealand and the United States have dropout rates of around 50 %, compared to other countries such as Australia, Denmark and Japan, where dropout rates are around 20 %. According to Acevedo (2021), dropout rates in higher education institutions in Latin America are also very high. In the European scope, Spain has fairly high university dropout rates. According to the Ministry of Universities (2022), the percentage of university students who drop out is over 15 %. Likewise, according to CRUE (2022), dropout rates in on-site public universities are above 20 % and exceed 40 % in off-site public universities. In the latest report published by the Spanish Ministry of Universities (Fernández-Mellizo, 2022), the dropout rate from undergraduate studies in on-site universities was 13 % of the student body. These figures give an idea of the impact exerted by this problem. In terms of dropout rates according to branches of knowledge (CRUE, 2022), the most noteworthy

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are Engineering and Humanities (27.19 %), Arts and Humanities (24.05 %), Science (19.8 %) and Social and Legal Sciences (18.40 %). However, the trend of low dropout rates in Health Sciences (12.01 %) continues.

Characterising university dropout is a complex problem. Studies carried out so far have shown the relationship of dropout with different types of variables (Aina et al., 2022; Constante-Amores et al., 2021; Peña-Vázquez et al., 2023). Low academic performance (Casanova et al., 2018), economic problems (Bertola, 2023), disadvantaged social contexts (Calamet, 2020), lack of integration at university (Esteban et al., 2017), stress (Eicher et al., 2014), low academic motivation (Thuy et al., 2017), relationships with faculty and peers (Bernardo et al., 2016), low academic engagement (Álvarez et al., 2021), poor self-regulation of learning (Merino-Tejedor et al., 2016), procrastination, and dissatisfaction with studies (Lindner et al., 2023; Merino-Tejedor et al., 2016), emotional problems (Pérez et al., 2022) or low satisfaction with the teaching received (Álvarez & López-Aguilar, 2020). These are variables that are positively related to dropout and explain why a high percentage of students give up their studies before completing them.

We are therefore faced with a multifactorial phenomenon, in which variables of a very diverse nature are related, which in most cases combine and lead to the interruption of studies (Schneider & Preckel, 2017). Research by Rodríguez-Pineda and Zamora-Araya (2021) shows the complex structure of factors involved in dropout. Through an exploratory factor analysis, they concluded that dropout was related to academic, motivational, economic, family and vocational variables. The study by Šabić and Puzić (2022) also highlights that the risk of dropping out is related to several factors (social background, income, academic and institutional characteristics). In the study by Lindner et al. (2023), a longitudinal study was carried out to positively confirm the reciprocal relationships between procrastination, satisfaction with studies and the propensity to withdraw from their studies among university students. According to the authors, procrastination has negative consequences for university students (it is positively related to dissatisfaction and, in turn, dissatisfaction is related to intention to drop out).

If we analyse some of the demographic, academic and economic characteristics of students in depth, several studies (Benítez et al., 2021; Cuji et al., 2023; Díaz et al., 2021; Zamora et al., 2023) indicate that variables such as gender, age, nationality, the type of studies students undertake, academic performance, the way they finance their studies or the combination of studies and work are factors to be considered when analysing the probability of students dropping out of university.

Regarding sex and age, there are no conclusive studies, as the findings are either one way or the other or no significant variables have been found. In this sense, Casanova et al. (2018) noted that women are more likely to give up their university studies, whereas Gairín et al. (2014) indicated that it is men who are more likely to drop out. As for age, Céspedes-López et al. (2021) argue that the older the student, the greater the likelihood of dropout. Nevertheless, Esteban et al. (2017) failed to determine its influence on dropout rates. Studies analysing the possible influence of having a scholarship/grant or not also reach conflicting results. In any case, authors such as Fernández-Martín et al. (2019) or Constante-Amores et al. (2021) concluded that age is a variable with a high incidence in dropout. Regarding employment status, research is more decisive and a strong association has been found between student employment and school dropout (an increased likelihood of withdrawal from studies among students who are employed) (Hernández & Vargas, 2016; Freixa et al., 2018; Tuero et al., 2018).

Although academic dropout is not a new issue, the fact is that year after year statistics continue to be reproduced that alert us to the seriousness of the problem. This gives rise to continuous calls for studies to help clarify the nature of this phenomenon and to identify variables that can help predict it (Huo et al., 2023; Li & Carroll, 2020). In this way, policies and programmes could be put in place to contribute to the integration and retention of students entering university, so that they are able to graduate upon completion of their studies (De Silva et al., 2022; Piepenburg & Beckmann, 2021). This would provide people with the

skills they need to enter the workplace. As Pérez and Aldás (2019) point out, in Spain around 45.5 % of young people go on to higher education, but only 32.9 % manage to graduate. And it cannot be overlooked that an important objective set by the European Union is that 40 % of the population between 30 and 35 years of age should achieve a qualification for employment (European Commission et al., 2015). For this reason, it is just as important for young people to choose university studies as it is for them to complete the university education they choose to pursue. To this end, it is necessary to analyse the variables with which dropout is related, in order to implement adaptation strategies before dropout occurs. In relation to this problem, the main purpose of this research was to identify which variables (academic, personal and contextual) predict university dropout.

2. Methodology

2.1. Hypothesis

Setting out from a review of previous research that has explored this problem in depth, and with the aim of determining which factors and personal traits may influence the likelihood of dropping out of higher education, the following hypotheses were put forward:

H1. The likelihood of a student dropping out of a university degree increases in students (demographic characteristics):

H1.1. Men

H1.2. Foreigners

H1.3. Aged below 25 years.

H2. The likelihood of a student dropping out of a university degree increases in students (academic characteristics):

H2.1. from the Social and Legal Sciences branch

H2.2. having gained access to university with low entry grades

H3. The likelihood of a student dropping out of a university degree increases in students (economic characteristics):

H3.1. without a scholarship or grant

H3.2. that are working

2.2. Participants

The study population was the 150,018 university students who enrolled in the first year of a degree course (period 2010–2018) at the Universities of Huelva, La Laguna and Zaragoza (Spain). The survey was carried out at the end of each academic year. These universities participated in the research project entitled “Analysis of the explanatory factors of university dropout and strategic actions for its improvement and prevention” (reference: “Analysis of the explanatory factors of university dropout and strategic actions for its improvement and prevention”): PID2020-114849RB-I00) funded by the Ministry of Science and Innovation of the Government of Spain. After the process of clearing the database containing the information used for the analyses, a total of 149,837 students took part in the study. To clear the database, the variables and cases were taken into account. Those variables with a high number of non-response cases were removed from the analysis. As for the cases, those containing incorrect answers were deleted (no information related to the variable). Subsequently, the remaining variables were examined and those in which all cases had responded were selected and different groupings were made according to whether or not the variable was significant with respect to the variable to be used in the analyses as the dependent variable (whether or not the student dropped out of the degree programme). Of the total study participants, 44.7 % ($n = 67,046$) were male and 55.3 % female ($n = 82,791$). Some 86.4 % ($n = 129,439$) were <25 years of age and 13.6 % ($n = 20,398$) were older.

The characteristics of the participating sample are presented in the table below (Table 1).

2.3. Study variables

The variables that were subjected to analysis are presented in Table 2. Specifically, this table shows the type of variables (dependent/independent), their name, the categorisation made and the percentage obtained.

These variables were gathered from the different data centres of the universities participating in the study. Although it is true that each institution had more information on the student body, in order to carry out a unified study, it was decided to use only the variables that were common to the different universities. Prior to accessing the data, the University of La Laguna, which was the institution from which the research project was managed and coordinated, asked the Research Ethics and Animal Welfare Committee (CEIBA) for a report confirming that the work met the ethical requirements for its development. The committee issued a favourable resolution (reference: CEIBA2021–3079) for the study to be carried out. Likewise, the data protection officers of the universities participating in the project established the procedures to be followed in order to access the information under study. In particular, the researchers of the research project signed a confidentiality agreement in which they were responsible for using the information provided by the data centres solely and exclusively for the purposes of this study.

With these preliminary steps in place, the researchers from the different universities participating in the project contacted their respective data centres, who provided the necessary information about the variables listed in Table 2. Some of the variables used in the analysis were not explicitly recorded in the original data repositories, and were calculated using the following procedures:

The dependent variable “degree course dropout” was calculated from the official definition of the Ministry of Universities of the Spanish Government, which indicates that a student has dropped out when “without having graduated from that degree they have not enrolled in it for two consecutive years”.

The databases of the participating universities had information on students in different administrative situations:

- Students who graduated in any degree.
- Students enrolled in each academic year.
- Students who transferred their file to another institution.

Those students who were listed as graduates were assigned the value “No” to the “degree course dropout” variable. Of the remaining students, the following were ruled out of the study:

- Those students who were enrolled in one of the last two academic years, as they are students with studies ongoing and it is not known whether they dropped out or not.

Table 1
Participating sample characteristics.

Sex	Men: 44.7 % (n = 67,046) Women: 55.3 % (n = 82,791)
Age	<25 years: 86.4 % (n = 129,439) 25 years or more: 13.6 % (n = 20,398)
Knowledge branch	Arts and Humanities: 9.6 % (n = 14,414) Science: 7.1 % (n = 10,705) Health Sciences: 14.7 % (n = 22,033) Social and Legal Sciences: 48.7 % (n = 72,955) Engineering and Architecture: 19.8 % (n = 29,730)
University	University of Huelva: 16.9 % (n = 25,383) University of La Laguna: 34.3 % (n = 51,440) University of Zaragoza: 48.7 % (n = 73,014)

Table 2
Variables used in the analysis.

Type	Variable	Category	Percentage
Dependent	Degree course dropout	0 = No	82.5 (n = 123,577)
		1 = Yes	17.5 (n = 26,260)
		1 = University of Huelva	16.9 (n = 25,383)
		2 = University of Zaragoza	48.7 (n = 73,014)
		3 = University of La Laguna	34.3 (n = 51,440)
		1 = Male	44.7 (n = 67,046)
		2 = Female	55.3 (n = 82,791)
		1 = <25 years	86.4 (n = 129,439)
		2 = 25 years or more	13.6 (n = 20,398)
		Independent	University
2 = Health Sciences	14.7 (n = 22,033)		
3 = Science	7.1 (n = 10,705)		
4 = Arts and Humanities	9.6 (n = 14,414)		
5 = Social and Legal Sciences	48.7 (n = 72,955)		
1 = (5–7)	39.1 (n = 58,530)		
2 = (7–9)	26.9 (n = 40,344)		
3 = (9–10)	10.8 (n = 16,220)		
4 ≥ 10	23.2 (n = 34,743)		
0 = No	64.2 (n = 96,202)		
Independent	Has a scholarship/grant	1 = Yes	35.8 (n = 53,635)
		1 = Foreign	28 (n = 4237)
Independent	Nationality	2 = Spanish	97.2 (n = 145,600)
		1 = No	96.3 (n = 144,332)
Independent	Working activity	2 = Yes	3.7 (n = 5505)

- Students who had finally transferred to another university, as it was not known whether or not they completed their studies at the new university.

The remaining students, having met the criteria of having enrolled in a university degree, not having graduated and not having requested a transfer of their transcript to another institution, were categorised with the value “Yes” in the “degree course dropout” variable.

As for the independent variables, the original coding is directly convertible to the values described below, with the exception of “scholarship/grant holder” and “work activity”. To determine the “scholarship/grant holder” field, an assignment was made according to the type of grant they had, in such a way that students who had a grant, regardless of the type, were assigned the value “Yes”. Similarly, for the “work activity” variable, the “Yes” coding was carried out in those cases in which the students engaged in a professional activity, whatever type of activity it might be.

2.4. Ethical issues

A favourable report was received from the Research Ethics and Animal Welfare Committee (CEIBA). In collaboration with the Data Protection Delegate of the participating institutions, an informed consent

and confidentiality commitment document was available for use in the research process. These documents were employed as a preliminary step prior to engaging with the participants. Their purpose was to communicate the study's objectives and to ensure the confidentiality of the information collected.

2.5. Analysis techniques

For the analysis of the characteristics of the student who dropped out of university, it was necessary to previously select those variables that presented significant differences between the groups analysed.

To assess independence among the variables, contingency tables were drawn up and the Chi-square test applied. In this type of test, the null hypothesis (H0) posits that the two variables are independent, while the alternative hypothesis (H1) suggests that there is some level of association or relationship between the variables. When looking for significant differences among the variables, depending on whether or not the student drops out of university studies, the probability is expected to be <0.05, so that the observed distribution does not behave like the expected distribution and, thus, the variables with significant and, therefore, independent differences can be used in the subsequent analysis. Table 3 summarises the percentages of each variable, depending on whether or not the student had dropped out of school, and the results of the Chi-square test, which were significant for all variables.

A Binary Logistic Regression (BLR) analysis was then applied. BLR is used to test hypotheses or causal relationships when the dependent variable is a binary/dichotomous variable, i.e. it has only two categories. BLR analysis is based on principles such as odds ratios and probabilities. Independent variables try to predict the probability of some event occurring over the likelihood of it not occurring.

The aim of this work is to look for those characteristics of students that may influence them to drop out of university studies. The

Table 3
Student features according to whether or not they drop out of the degree programme, and Chi-square results.

Variable	Category	Drops out		Chi-square
		No	Yes	
University	University of Huelva	16.4	19.7	$\chi^2(2) = 650.055$ $p \leq .000$
	University of Zaragoza	50.2	41.6	
	University of La Laguna	33.4	38.7	
Sex	Male	42.2	56.7	$\chi^2(1) = 1836.289$ $p \leq .000$
	Female	57.8	43.3	
Age	<25 years	89.7	70.9	$\chi^2(1) = 6475.311$ $p \leq .000$
	25 years or more	10.3	29.1	
Study branch	Engineering and Architecture	18.6	25.6	$\chi^2(4) = 3095.746$ $p \leq .000$
	Health Sciences	16.7	5.1	
	Science	7.4	6.1	
	Arts and Humanities	8.8	13.6	
	Social and Legal Sciences	48.5	49.6	
University entrance qualification	(5-7)	34.2	62.0	$\chi^2(3) = 9571.894$ $p \leq .000$
	(7-9)	26.9	27.2	
	(9-10)	11.9	5.9	
Has a scholarship/grant	>10	27.1	4.9	$\chi^2(1) = 182.815$ $p \leq .000$
	No	63.4	67.8	
Nationality	Yes	36.6	32.2	$\chi^2(1) = 91-567$ $p \leq .000$
	Foreign	2.6	3.7	
Working activity	Spanish	97.4	96.3	$\chi^2(1) = 927.633$ $p \leq .000$
	No	97.0	93.1	
	Yes	3.0	6.9	

dependent variable, degree course dropout, has two categories: 0 = No and 1 = Yes.

The model proposed in this paper is:

$$Y = \text{pro}\{\text{yes}\} = \frac{1}{1+e^{-Z}}$$

where Z is the following linear combination

$$Z = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + \varepsilon$$

Y = probability of occurrence of the event, dependent variable
 X1, X2, X3, X4, X5, X6, X7, X8 = scores of the independent variables
 b0 = constant
 b1, b2, b3, b4, b5, b6, b7, b8 = estimated regression coefficient estimates that report how much the probability of occurrence of Z varies in the face of a unit change of each independent variable, all other variables remaining constant.
 ε = estimation error.

To corroborate that the results of the BLR are feasible, it is necessary to analyse the goodness of fit of the model and the relationship of the independent variables on the dependent variable. The Enter method, which uses all the variables in a single step, was applied.

On the goodness of fit of the model, it is necessary to analyse:

1. Chi-square significance of the model in the omnibus test. Significance <0.05 shows that the model helps explain the event, i.e. the independent variables explain the behaviour of the dependent variable. In this study, the outcome was significant (0.000).
2. "Cox and Snell's R-squared and Nagelkerke's R-squared. These indicate the part of the variance of the dependent variable explained by the model. The part of the dependent variable explained by the model is interpreted as ranging between the Cox and Snell R-squared and the Nagelkerke R-squared" (Marco-Franco, 2022, p.93). The higher the R-squared, the more explanatory the model is. The results range from 16.7 % (0.167 Cox and Snell R-squared) to 29.7 % (0.297 Nagelkerke R-squared).
3. "Overall percentage correctly classified, i.e. the number of cases that the model is able to predict correctly. Based on the regression equation and the observed data, a prediction of the value of the dependent variable (predicted value) is made, which is compared with the observed value; if it is correct, the case is correctly classified" (Medel-Ramírez & Medel-López, 2018, p.41). The closer the predicted value matches the observed value, the more explanatory the model is, i.e. the more the independent variables are good predictors of the dependent variable. In this case, 82.2 % were correctly classified.

Regarding the relationship of the independent variables with the dependent variable, the following should be considered:

1. The individual significance of each of the parameters (B). If it is <0.05, that independent variable explains the dependent variable.
2. The sign of B shows the direction of the relationship.
3. As we did in other work (Peña-Vázquez et al., 2023, p.301), for interpretation purposes, Exp (B), exponential of B, represents the odds ratio and indicates the strength of the relationship (the further away from 1, the stronger the relationship). "When Exp (B) is >1, it indicates that an increase in the independent variable increases the odds of the event (dependent variable) occurring. When Exp (B) is <1, it indicates that an increase in the independent variable reduces the odds of the event (dependent variable) occurring". To compare the exponentials of B with each other, those that are <1 must be transformed into their inverse or reciprocal, i.e., we must divide 1 by the value of Exp (B).

3. Results

Table 4 shows the results of the BLR concerning the variables within the equation.

To achieve a model whose variables have greater explanatory power for the dependent variable, the backward stepwise method was used, which introduces all the predictor variables at the start of the analysis. At each step, the least significant term is removed from the model. Thereafter, the algorithm alternates between forward entry of out-of-model terms and backward elimination of stepwise terms from the model. This continues until there are no terms left that meet the inclusion or deletion criteria. However, in this analysis, all variables were significant in the first step. The results indicate the following:

- 1) University. The negative value of B and the result of Exp (B) indicate that a student is 1.1669 times less likely to drop out at the University of Huelva than at the University of La Laguna and 1.4451 times less likely at the University of Zaragoza.
- 2) Sex. The positive value of B and the result of Exp (B) indicate that a male student is 1.548 times more likely to drop out of university than a female student.
- 3) Age. The negative value of B and the result of Exp (B) indicate that a student under 25 is 2.3259 times less likely to drop out than an older student.
- 4) Knowledge branch. The negative value of B and the result of Exp (B) indicate that a student from the Health Sciences branch of knowledge is 2.2272 times less likely to drop out of university than a student from Social and Legal Sciences. Meanwhile, students from Sciences and Arts and Humanities presented a higher probability (1.107 and 1.442 respectively). The Engineering and Architecture branch was not significant.
- 5) University entry qualification. The positive value of B and the result of Exp (B) indicate that the lower the university entry grade, the more likely the student is to drop out. Students with a grade between 5 and 7 are 6.151 times more likely to drop out than a student with a grade higher than 10. Students with a grade higher than 7 and lower than 9 are 4.304 times more likely to drop out and those with grades between 9 and 10 are 2.318 times more likely to drop out.
- 6) Scholarship/grant. The positive value of B and the result of Exp (B) indicate that a student without a scholarship or grant is 1.130 times

more likely to drop out of university than a student awarded a scholarship/grant.

7) Nationality. The positive value of B and the result of Exp (B) indicate that a foreign student is 1.216 times more likely to drop out of university than a Spanish student.

8) Working activity. The negative value of B and the result of Exp (B) show that a student who does not work is 1.4728 times less likely to drop out of school than a student who works.

4. Discussion and conclusions

The main objective of this research was to identify the characteristics from which the profile of students who interrupt higher education can be obtained and determine the probability of dropping out. To this end, the study used variables related to the demographic, academic and economic features of the student body. In terms of the hypotheses proposed, it should be noted that, in general, all the variables studied were significant and influential in the probability of dropping out of the degree programme. However, despite being significant, a more precise and detailed analysis of the hypotheses and the results obtained revealed that the first and second hypotheses were partially fulfilled, while the third hypothesis was fully met.

The *demographic characteristics* analysis indicated that the probability of a student dropping out of a university degree increases for male students and students from other (foreign) countries. Regarding the gender variable and the “male students” characteristic, we found agreement with the results obtained by Lindner et al. (2023). However, it is not the under 25 s who drop out most, but the older ones, so that H1.3 is not fulfilled. Although there is a coincidence of results with those reported by Gairín et al. (2014) and Céspedes-López et al. (2021), in the case of age there is a discrepancy with the findings of Lindner et al. (2023), who state that “age” is not related to dropping out, although years of schooling is related to “age”.

Regarding *academic characteristics*, students from the Social and Legal Sciences branch are more likely to drop out, but only with respect to those from Health Sciences (not compared to the rest of the branches). These results do not coincide with those reported by Constante-Amores et al. (2021), who argued that the Arts and Humanities and Social and Legal Sciences branches are the ones with the highest dropout rates. Nevertheless, they are in line with the results achieved by Peña-Vázquez et al. (2023), who showed that the students most likely to drop out were

Table 4
BLR analysis results. Variables in the equation.

	B	E.T.	Wald	gl	Sig.	Exp(B)	I.C. 95,0 % EXP(B)	
	Inferior	Superior	Inferior	Superior	Inferior	Superior	Higher	Lower
Step 1 (a)			440,817	2	,000			
University								
Huelva University	-,155	,020	57,458	1	,000	,857	,823	,892
Zaragoza University	-,367	,018	440,680	1	,000	,692	,669	,717
Male	,437	,015	808,968	1	,000	1548	1502	1595
Under 25 years old	-,845	,018	2101,991	1	,000	,430	,414	,445
Branch			1065,852	4	,000			
Engineering and Architecture	,009	,019	,206	1	,650	1009	,972	1047
Health Sciences	-,801	,031	657,519	1	,000	,449	,422	,477
Science	,102	,031	11,097	1	,001	1107	1043	1176
Arts and Humanities	,366	,023	257,429	1	,000	1442	1379	1508
Entry grade			4088,536	3	,000			
[5-7]	1817	,031	3421,873	1	,000	6151	5787	6536
(7-9)	1460	,032	2081,694	1	,000	4304	4043	4583
[9-10]	,841	,039	455,163	1	,000	2318	2146	2504
No grant	,122	,017	51,254	1	,000	1130	1092	1168
Foreign nationality	,196	,039	25,052	1	,000	1216	1127	1313
Not working	-,387	,033	140,999	1	,000	,679	,637	,724
Constant	-1954	,048	1623,868	1	,000	,142		

Reference category: student at the University of La Laguna, female, 25 years or older, Social and Legal Sciences, with an entrance grade of >10, Spanish nationality and working.

those enrolled in the Science and Arts and Humanities streams. These authors also found that the students with the lowest probability of dropping out were those studying Health Sciences degrees. Thus, as stated, H2.1 was not fulfilled. However, it was confirmed that the lower the university entrance qualification, the more likely students are to drop out. As Rodríguez-Pereiro et al. (2019) point out, prior attainment is a crucial factor that has a decisive influence on students' later achievement. These results are in line with those of Casanova et al. (2018), who pointed out that low student performance is one of the factors with the highest incidence in academic dropout. This is a relevant fact, with a clear practical projection, as it highlights the need to provide special attention to these students, so that they can integrate in better conditions at university.

In terms of *economic characteristics*, not having a scholarship/grant or combining work and studies have an influence on dropout, given that students without a scholarship and those who are working are the most likely to drop out. These results coincide with the findings in other research (Fernández-Martín et al., 2019; Constante-Amores et al., 2021; Fernández-Mellizo, 2022), where it has been shown that students with a lower socioeconomic status have a higher risk of dropping out of university.

Ultimately, the results obtained in this research are in line with those reported by Rodríguez-Pineda and Zamora-Araya (2021) and Šabić and Puzić (2022), who also highlighted that it is not possible to speak of a single factor when explaining the causes of university academic dropout, but rather a network of factors that intervene to cause the interruption of studies. Aina et al. (2022, p.16) presented results that point in the same direction: university dropout is a consequence of "a combination of individual, institutional and economic factors". Their effects on the decision to discontinue training are mediated by the students' inability to integrate into the training system. The work of Schneider and Preckel (2017) also reflects the cluster of variables that are related to school dropout. Students who are well adjusted to university and perform well tend to be characterised by a high level of self-efficacy, a high degree of prior achievement and intelligence and high levels of responsibility, as well as application of appropriate learning strategies to achieve desirable goals. In turn, these high-achieving students tend to have faculty who work hard to design courses well, set clear learning objectives and provide feedback practices. A recent study by Paseggia et al. (2023) examined the relationships between motivation to study, retrospective evaluation of school experiences, subjective well-being, academic engagement and intention to drop out. They tested different structural equation models to analyse the relationships between variables and all of them showed that motivational styles predicted students' engagement, which in turn directly and indirectly influenced their intention to drop out.

The research we present constitutes an important contribution to the challenge of improving the situation of the academic problem in universities. The analyses carried out made it possible to identify various characteristics (personal, academic, social, etc.) that have an impact on dropout, which can facilitate decision-making on measures of various kinds to reduce the impact of dropout. From the results obtained in the study, it is concluded that it is important to improve the initial information systems for students and to facilitate integration into academic life in the first year, as these are key to integration and academic success and would reduce the risk of dropping out. And in this sense, it is important to strengthen the tutorial and guidance work of university lecturers, who must not only educate but also accompany students and guide them in their learning process (Álvarez-Pérez & López-Aguilar, 2023).

For the future, it would be interesting to complete this research with other studies of a more qualitative nature, in order to further study variables such as gender, branch of knowledge, available economic resources, place of origin, professional activity, etc. and their impact on academic dropout. This would even make it possible to delve deeper into how students make the decision to drop out, which can provide sensitive

information to be able to act in the future in a preventive manner in the face of this problem. Works such as those by Lindner et al. (2023), in which a longitudinal study over three years was used to confirm the positive relationship between procrastination, satisfaction with studies and dropout intention in university students, constitute a good methodological reference to be considered in the future.

Future research could also look more closely at other variables that could also help to explain dropout more precisely, such as motivation, satisfaction with studies, academic commitment and similar aspects. Finally, the need to further refine the instruments for collecting data on academic dropout should be noted.

CRedit authorship contribution statement

María Olga González-Morales: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation. **David López-Aguilar:** Writing – review & editing, Writing – original draft, Funding acquisition, Formal analysis, Conceptualization. **Pedro Ricardo Álvarez-Pérez:** Writing – review & editing, Writing – original draft, Conceptualization. **Pedro Antonio Toledo-Delgado:** Writing – review & editing, Writing – original draft, Methodology, Data curation.

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Declaration of competing interest

The authors of the manuscript entitled "Dropping out of higher education: Analysis of variables that characterise students who interrupt their studies" declare that they have no conflicts of interest.

Data availability

The data that has been used is confidential.

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