An Analysis of Student Satisfaction and its Relationship with Academic and Social Factors in University Dropout

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Abstract

Over the last 50 years, Higher Education has experienced significant development, which has been associated with challenges that have yet to be solved. In this sense, university dropout is a global phenomenon that worries universities all over the world. Many research studies describe the possible causes of this phenomenon, but the most interesting are those that, due to their predictive potential, have the possibility of preventing it. The aim of this article is to study how important students perceive the different reasons for dropout in relation to the idea of abandoning the degree. For this purpose, the Spanish version of the *Questionnaire of Motives for Higher Education Dropout* (QMA_es; Almeida et al., 2019) was applied to a sample of 927 first- and second-year university students. These data have been processed using educational data mining (EDM) techniques, obtaining a decision tree that correctly classifies the sample in 81.1%. The results show that variables related to student satisfaction (satisfaction with academic choice, satisfaction with performance, and satisfaction with the financial situation) and to the academic and social environments play a predominant role in the approach to dropout, above other institutional, financial, and wellbeing variables.

Keywords

University dropout, dropout intention, satisfaction, educational data mining

Un Análisis de la Satisfacción Estudiantil y su Relación con los Factores Académico y Social en el Abandono Universitario

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Resumen

En los últimos 50 años la Educación Superior ha sufrido un desarrollo significativo, el cual ha venido acompañado de retos aún pendientes de resolver. En este sentido, el abandono de los estudios universitarios es un fenómeno global que preocupa a universidades de todo el mundo. Multitud de investigaciones describen las posibles causas del abandono, pero más interesantes son que tienen la posibilidad de prevenirlo. El objetivo del artículo es estudiar cómo de importantes perciben los estudiantes diferentes motivos de abandono en relación con el planteamiento de abandonar la titulación. Para ello se ha aplicado el cuestionario *Motivos de Abandono en Educación Superior,* versión española (QMA_es; Almeida et al., 2019), a una muestra de 927 universitarios de primer y segundo curso. Estos datos han sido sometidos a técnicas de minería de datos educacionales (EDM) obteniendo un árbol de decisión que clasifica correctamente a la muestra en un 81.1%. Los resultados muestran que las variables relativas a la satisfacción del estudiante (satisfacción con la elección académica, satisfacción con el rendimiento y satisfacción con la situación financiera) y a los entornos académico y social juegan un rol preponderante en el planteamiento de abandono, por encima de otras variables institucionales, financieras y de bienestar.

Palabras clave

Abandono universitario, intención de abandono, satisfacción, minería de datos educacionales

I n the last fifty years, Higher Education has experienced a significant development from being reserved for elites to being accessible to a high percentage of the world's population (Konstantinovskiy, 2017; Venegas-Muggli, 2022). Consequently, according to United Nations data, the enrolment rate in university education rises to 51.2% (United Nations, 2022), resulting in a more heterogeneous student population. However, despite such an increase in enrolments, not all students successfully complete their university studies. In sense, the Organisation for Economic Cooperation and Development (OECD), in the year 2020, showed an average graduation rate for member countries of 69% (OECD, 2023).

Behind this statistic, one phenomenon can be observed: the dropout rate. It should be clarified that, as part of this phenomenon, there is a discrepancy between one definition and another. The most widely accepted definition of dropout is the one that states that being a student who, having started certain studies, stops enrolling in them for at least two consecutive academic years since the last enrolment (Casanova et al., 2018). However, taking this definition into account, we can find two different scenarios (Kehm et al., 2019). On the one hand, we speak of "dropout of the studies" when the student leaves the university system definitively, not re-enrolling in any degree programme at any university. On the other hand, we speak of "degree dropout" or "transfer" when the student chooses to enrol in a different degree.

Both types of dropout involve a waste of the resources of the student, the family, the university institution and the society (Améstica-Rivas et al., 2021). In addition, dropout also leads to less educated and less qualified people, which impacts both the individual and the society (González-Ramírez & Pedraza-Navarro, 2017). For all those reasons, the dropout rate has become one of the main indicators of the quality of the university system and consequently, countries all over the world have developed educational policies designed to improve graduation rates and reduce dropout rates. Examples of these are the *2030 Agenda for Sustainable Development* (ONU, 2015) and the European strategy *Universities Without Walls: A Vision for 2030* (European University Association, 2021).

However, even though these policies have been somehow successful, the dropout problem remains as the average European retention rate have risen from 33% in 2010 to 40.5% in 2021 (EuroStat, 2023); there is still a high dropout rate from university studies in countries all over the world. In Spain, the data indicate that the dropout rate is stable, going from 32% in 2015 to 33.2% in 2021 and, inside this, the contribution made by the transfer rate increases from 10.9% to 12.4% respectively (Ministerio de Educación, Cultura y Deporte, 2016; Ministerio de Universidades, 2022).

The above data have captured the attention of multiple researchers all over the world, who have initiated studies of the phenomenon from different approaches, such as psychological, social, economic and institutional (Gómez et al., 2021). Abundant literature highlights that the causes that trigger university dropout processes are multiple (Cruz-Campos et al., 2023; Lorenzo-Quiles et al., 2023), the holistic approach has gained particular importance, which combines the mentioned approaches to try to find ways of intervention and prevention.

Taking the holistic approach as a reference, different groups of variables have been studied and the relationship established between them has been investigated. This paper focuses on some of the most analysed variables, such as academic, social, affective, institutional and economic variables.

Of all these variables, academic variables have received particular attention, the most studied of which is academic achievement (Parra-Sánchez et al., 2023), so that students with low academic performance are more likely to dropout (Constante-Amores et al., 2021; Mora et al., 2019).

Also, in the university environment, students must interact with each other, with social variables such as social integration (Baalmann et al., 2022; Morelli et al., 2022), sense of belonging (Fourie, 2018) and perceived social support (Samuel & Burguer, 2020; Tinajero et al., 2020) playing an important role in university dropout. Studies like the one developed by Mostert and Pienaar (2020) found that students who had a good social support network, despite showing symptoms of burnout, were more likely to continue with their higher education studies.

On the other hand, affective variables, those related to the feelings involved in the teaching-learning process, may influence the consolidation of university dropout. This is an extensive set of variables, including student satisfaction and wellbeing. Student satisfaction, understood as a subjective and favourable evaluation of various results and experiences related to studies (González-Peiteado et al., 2017), has been positioned as a very relevant affective variable withing this phenomenon. There are numerous studies that have found that motivated and academically satisfied students report lower intentions of dropping out of higher education (Barrientos-Illanes et al., 2021; Castro-López et al., 2022; Norvilitis et al., 2022). And in recent years, the study of variables related to student wellbeing, interpreted as optimal psychological functioning, has gained relevance (Solano, 2009). In this line, a direct and negative relationship has been observed between wellbeing and the intention to dropout (Pedler et al., 2022).

At the institutional level, it has been observed that the relationship students establish with their teachers may be essential, as it acts as a protective factor against dropout (Lorenzo-Quiles et al., 2023; Tuero et al., 2018). It is also known that other variables, such as the quality of the educational programmes or institutional support, may influence dropout (Valencia-Arias et al., 2023).

Finally, economic, or financial variables should also be mentioned, such as, for example, the socio-economic level of the family, which can be an essential element in the processes of consolidation of the dropout (Poveda et al., 2020). This is because combining studies with remunerated work to be able to access university or to contribute to the family economy is associated with a higher probability of dropping out (Constante-Amores et al., 2021; Santos-Villalba et al., 2023).

As the scientific literature on dropout has grown, the data analysis techniques used have increased too (Gooderham, 1994). Although many studies continue to use classical statistics, more recently new techniques have emerged, among which Educational Data Mining (EDM) stands out. EDM is a field of study that emerges from Data Mining and is focused on developing mathematical methods to analyse data from educational environments and extract as much information as possible to better understand learning processes (Chango et al., 2022), facilitating the detection of patterns in the data hidden for descriptive and inferential statistics (Chango et al., 2022; Mohamad & Tasir, 2013).

By means of EDM techniques is possible to answer a wide range of questions, including those related to academic achievement and retention. An example of this is the study developed by Cerezo et al. (2020) who, by applying the EDM to the results recorded in the Moodle of a

university course, analyse the learning processes developed by students and predict academic achievement.

It is observed that there are many examples in which EDM is used to predict academic achievement (Alturki et al., 2022), but this is not the case when it comes to retention in the degree programme. One of the few examples is provided by Wan et al. (2020), who, using data obtained through different EDM techniques, develop efficient dropout prediction models. Another example is offered by Jiménez et al. (2023), who use decision trees to determine the most relevant variables for predicting dropout.

In relation to the mentioned situation, the aim of this study is to examine the students' perception of the importance of academic, social, affective, institutional and financial variables in the dropout process, using Educational Data Mining.

Method

Sample

For this study, we used a non-probabilistic and incidental sample of 927 students from a university in the north of Spain. 72.1% of them were women, and 27.9% were men, an aspect that is due to the traditionally feminised nature of some of the degrees under study.

The average age of the students is 19.41 years (SD = 4.86), although the mode is 18 since a large majority of the students are first-year students. The following table (Table 1) shows all the descriptive data of the sample.

Table 1
Description of the Sample

	Frecuency	**Percentaje**
Sex		
Man	259	27.9%
Woman	668	72.1%
Age		
<19 years old	435	49.6%
19-20 years old	357	38.5%
>20 years old	129	18.9%
Course		
1º	649	70.2%
2º	276	29.8%
First choice studies		

	Frecuency	Percentaje
Yes	847	91.4%
No	80	8.6%
Degree		
Psychology	226	24.4%
Teacher in Pre-school Education	180	19.4%
Teacher in Primary Education	94	10.1%
Law	80	8.6%
History	69	7.4%
Law + Business Administration	62	6.7%
Business Administration	55	5.9%
Logopedy	51	5.5%
Philosophy	45	4.9%
History of Art	40	4,3%
Economy	16	1.7%
Accounting and Finance	4	0.4%
First choice university		
Yes	847	91.4%
No	80	8.6%

Instrument

The Spanish version of the *Questionnaire of Motives for Higher Education Dropout* (QMA_es; Almeida et al., 2019), an instrument that tries to determine the importance that students attach to various situations of difficulty, demotivation or discomfort experienced during their university life and that could be related to their intention to drop out, has been implemented in the sample. The instrument has been validated in Portugal, Brazil and Spain obtaining in all of them a good internal consistency, (Spain: KMO = .916; Bartlett's test of sphericity = 124.068; gl = 496; p = .000; variance explained by the first six factors = 61.90%, in (Almeida et al., 2019, p. 204) and in the sample it has also shown good psychometric properties (CFI > .90; SRMR < .07; SMSEA < .07; α = .946).

The QMA_es is composed of 39 items, which are grouped into broad areas of reasons for dropout: financial area (example item "I have difficulty paying tuition fees"), institutional environment (e.g. "there is a lack of student support services"), academic environment (e.g. "I find it difficult to do group work"), relationship with lecturers (e.g. "I don't like the teaching method of lecturers"), social interaction (e.g. "I don't identify with colleagues in my course or institution") and wellbeing (e.g. "I do not succeed in integrating socially at university").

Students had to rate the degree of importance they attach to each item in relation to their intention to dropout, using a 5-point Likert response scale (1.- Not important, 2.- Not very important, 3.- Neutral, 4.- Somewhat important, 5.- Very important).

The instrument used contains 53 items in total because it includes both the QMA_es and three other blocks of items (socio-demographic data, satisfaction, and intention to dropout). The first collects socio-demographic data relating to age, sex, access grade, current degree, whether they are studying for their first-choice degree, and whether they are studying at their first-choice university.

Another section evaluates student satisfaction by using 6 items that ask about the degree of satisfaction with aspects such as: academic choice, current degree, participation in classes, completion of assignments on time, academic achievement and financial situation. It also uses a 5-point Likert-type response scale (1.- Not satisfied, 2.- Not very satisfied, 3.- Neither satisfied nor dissatisfied, 4.- Quite satisfied, 5.- Very satisfied).

Finally, two questions on intention to dropout are included: whether the student has ever intended to drop out of the degree programme or whether the student has ever intended to drop out of university studies. Both questions are dichotomic; to be answered using a yes or no format.

Procedure

The data collection procedure began after receiving permission from the Ethics Committee of the participating university. Then, teachers from different degree programmes were contacted, the aim of the research was explained to them, and their collaboration was requested. The members of the research team then arranged a date with those who gave their consent to go to the classroom where they taught.

The questionnaire was implemented on Google Forms in person, so the researchers were also able to explain the purpose of the research to the students, answer any questions they had and guarantee the ethical principles of anonymity and confidentiality that are usual in this type of study.

Data Analysis

The data collected were analysed using the statistical package SPSS Statistics v. 24.0, using descriptive analyses and decision trees.

Results

For the classification tree, the dependent variable taken was the item: *"Have you ever thought about dropping out of your degree"*, a dichotomous variable that asks about the intention to drop out of the degree course. Of the total sample, 68.1% could be classified as intending to continue, while 31.9% of the subjects questioned had thought about dropping out of the degree at some point during their studies and were therefore categorised as intending to dropout.

Taking the above information into account, a model has been validated (Table 2), creating a classification tree that allows us to identify the variables that are most important when considering permanence or dropping out of the degree course enrolled.

Table 2
Model Classification Table

Risk Estimation	Desviation Error
.189	.013

In this context, the model predicts 81.1% of the cases correctly (see Table 3), 92.6% of the persistence intention group, and 56.8% of the dropout intention group.

Table 3
Model Classification Table

	Predicted		
Observed	**UES**	**NO**	**Correct percentage**
YES	168	128	56.8%
NO	47	584	92.6%
Global percentage	23.2%	76.8%	81.1%

Firstly, the classification tree shows that the lower the degree of satisfaction with the academic choice, the higher the intention to dropout. In this way, 90.4% of the students whose assessment is "not very satisfied" have considered dropping out. On the other hand, this number decreases drastically among students who rate their academic choice as "quite satisfied", where the intention to dropout is 10.7%.

Next, taking into account the extent of the tree obtained, we will divide its explanation into four blocks according to the classificatory values derived from the first variable, referring to the degree of satisfaction in their academic choice ($\chi^2 = 258.552$; p = .000).

The first block includes students who are very dissatisfied or dissatisfied with the academic choice ("$\leq$ dissatisfied"), who are referred to as "dissatisfied students". Figure 1 shows how the 90.4% of the members of this category have intentions to dropout.

The second block –also shown in Figure 1- includes students whose assessment is "somewhat satisfied" or "neutral" with regard to the degree of satisfaction with the academic choice, who are referred to as "indifferent students". Again, there is a division into two groups, also according to the importance given to the academic factor. In this case, those that give more importance to this factor (>11) have more intention to dropout (73.4%) ($\chi^2 = 11.723$; p = .005).
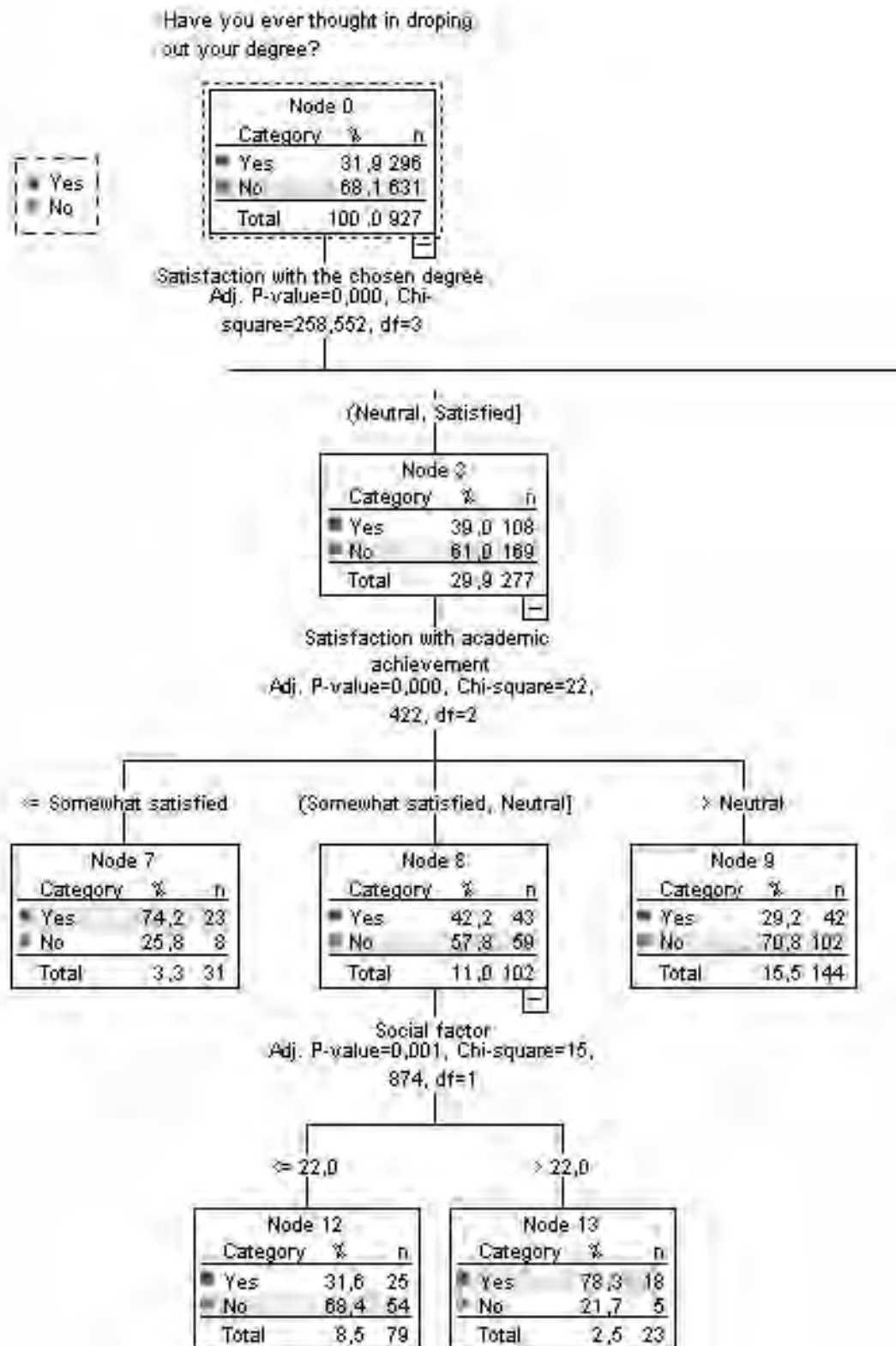
Figure 1

Blocks of Variables of Low Satisfaction with Academic Choice from the Decision Tree in relation to Intention to Dropout (Blocks 1 and 2)
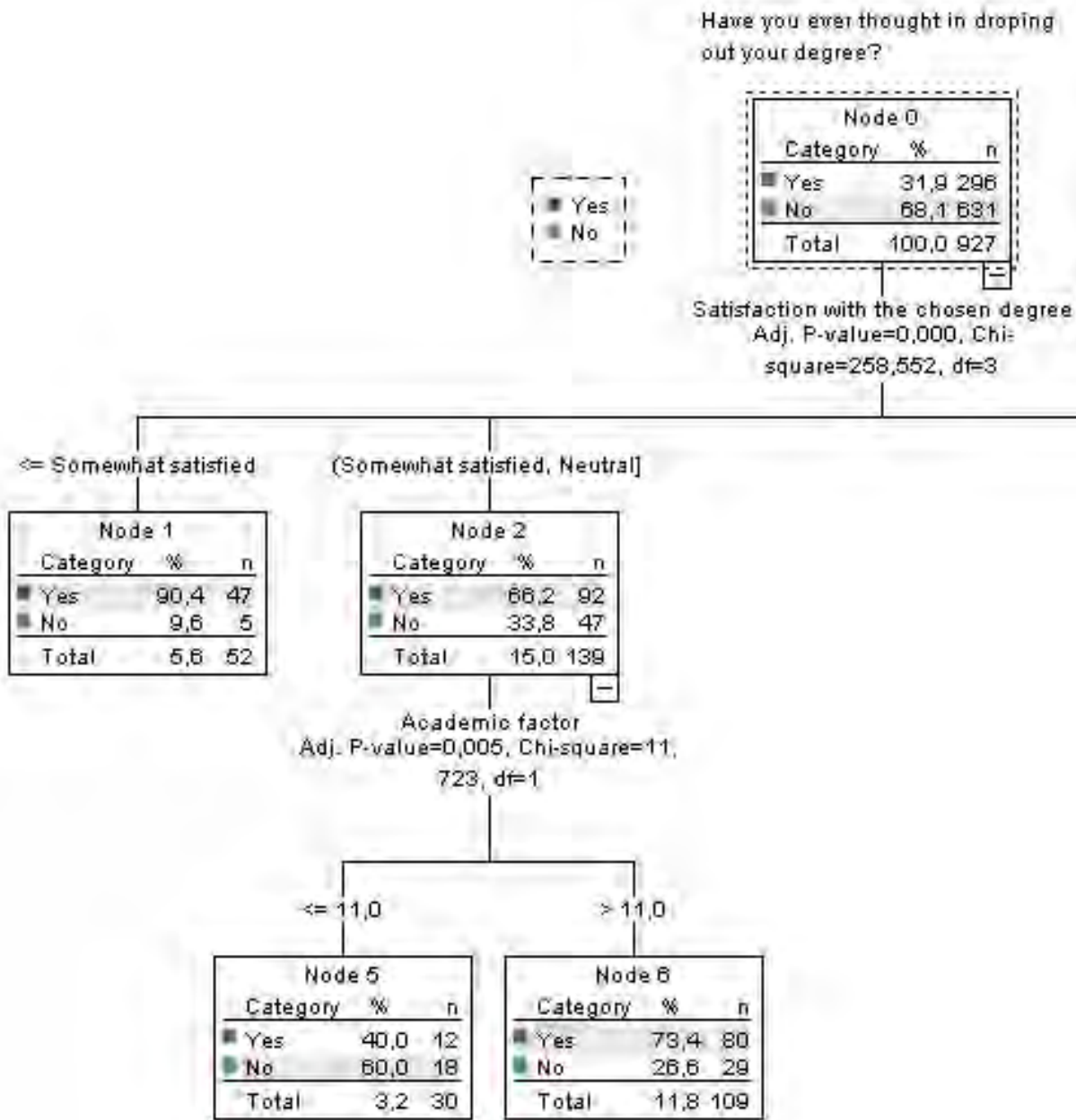
The third block includes those who rate the degree of their academic choice as "neutral" or "satisfied", who are referred to as "moderately satisfied students". Figure 2 shows that a second level emerges according to the degree of satisfaction with academic achievement ($\chi^2 = 22.422$; p = .000), so that in general, the lower the satisfaction with achievement, the higher the intention to dropout. However, among those who are "somewhat satisfied" or "neutral", a third level opens up in relation to the importance given to the social factor ($\chi^2 = 15.874$; p = .001), with an increase in the intention to dropout among those who attach greater importance to this factor (78.3%).

Figure 2

Block of Variables of Medium-High Satisfaction with Academic Choice from the Decision Tree in Relation to Intention to Dropout (Block 3)

Have you ever thought in droping out your degree?

Node 0		
Category	%	n
■ Yes	31,9	296
■ No	68,1	631
Total	100,0	927

■ Yes
■ No

Satisfaction with the chosen degree
Adj. P-value=0,000, Chi-square=258,552, df=3

(Neutral, Satisfied]

Node 3		
Category	%	n
■ Yes	39,0	108
■ No	61,0	169
Total	29,9	277

Satisfaction with academic achievement
Adj. P-value=0,000, Chi-square=22,422, df=2

<= Somewhat satisfied

Node 7		
Category	%	n
■ Yes	74,2	23
■ No	25,8	8
Total	3,3	31

(Somewhat satisfied, Neutral]

Node 8		
Category	%	n
■ Yes	42,2	43
■ No	57,8	59
Total	11,0	102

> Neutral

Node 9		
Category	%	n
■ Yes	29,2	42
■ No	70,8	102
Total	15,5	144

Social factor
Adj. P-value=0,001, Chi-square=15,874, df=1

<= 22,0

Node 12		
Category	%	n
■ Yes	31,6	25
■ No	68,4	54
Total	8,5	79

> 22,0

| Node 13		
Category	%	n
■ Yes	78,3	18
■ No	21,7	5
Total	2,5	23

Finally, the fourth block analyses those who rate the degree of satisfaction with their academic choice very satisfactorily (">satisfied"), who are referred to as "satisfied students". In this group (Figure 3) there is a second level determined by the degree of satisfaction with

the economic situation (χ^2 = 17.494; p = .000). A higher dissatisfaction in this variable ("≤neutral") increases the intention to dropout (18.4%) compared to the group with a higher degree of satisfaction. A third level also emerges from this second level, so that for those students who are more dissatisfied with their economic situation, the academic factor becomes more important. Students who consider this aspect to be more important show a higher intention to dropout.

Figure 3

Block of Variables of High Satisfaction with Academic Choice from the Decision Tree in Relation to Intention to Dropout (Block 4)
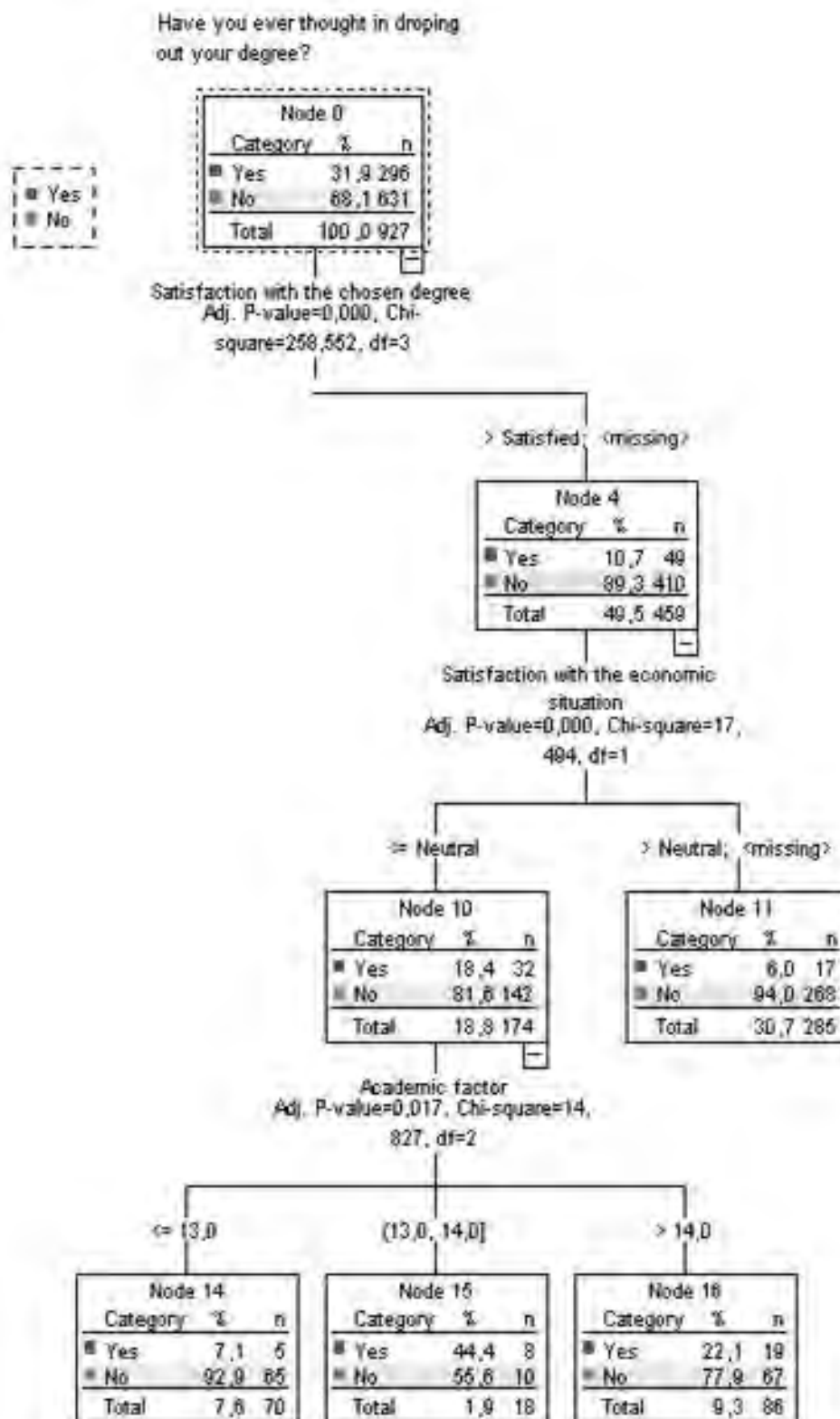
Discussion

The aim of this research was to investigate students' perceptions of the importance that academic, social, affective (satisfaction and wellbeing), institutional and financial variables may have on the intention to dropout. This is a relevant contribution since, as has been explained before, there are previous investigations that have covered the importance of each of these variables, but in this case, all of them are analysed together, based on the students' perception, in order to find out which of them are more significant in the approach to dropout from the degree course studied. In relation to this problem, the results highlight as main influencing variables related to satisfaction, the academic and social factors above the institutional, financial and wellbeing variables.

Specifically, the findings highlight the role of student satisfaction in student dropout. Numerous studies have shown that these variables are related to university dropout (Barrientos-Illanes et al., 2021; Behr et al., 2020; Castro-Lopez et al., 2022; Mostert & Pienaar, 2020), and satisfaction is so important that the European University Association includes satisfaction-related variables among the indicators of quality in Higher Education in Europe (Loukkola et al., 2020).

More specifically, the research data point to satisfaction with academic choice as the most relevant reason for considering dropping out, and the lower the degree of satisfaction, the higher the intention to drop out. Several studies point to students not having made a choice based on vocational maturity (Kapoor & Gardner-McCune, 2019; Orenes & Sanchez, 2021) or that the desired degree entry requirements were not achieved by the student (Böttcher et al., 2020; Maphosa et al., 2023).

In addition, satisfaction with academic choice led to identify four groups of students: "dissatisfied", "indifferent", "satisfied" and "more than satisfied". The group of students who are dissatisfied with their choice of degree programme takes the academic factor very much into account, so that the greater the importance given to this factor, the greater the intention of dropping out of university.

The second group of identified students are those who are indifferent about their academic choice and, in this case, students who attach greater importance to the academic factor show a higher proportion of dropout intentions than those who do not attach much importance to this factor. This group, although similar to the previous one, shows a more passive attitude to their studies, giving less value to the influencing variables.

The third group includes students who are satisfied with their academic choice, with the variable satisfaction with academic achievement coming into play. There is a higher proportion of students who consider dropping out when this variable takes low values. Among them, those who give little or some importance to academic achievement are also influenced by the social factor, with higher dropout intentions among those students who give more importance to this factor.

The fourth group is formed by students who are more than satisfied with their academic choice and have the lowest intention to dropout. However, among these, some students consider the degree of satisfaction with their financial situation as an influential variable in the dropout approach. Among those with the lowest degree of satisfaction with their financial situation, students again give greater importance to the factor related to the academic

environment. This can be explained by the level of resilience of these students, that with a good support climate seem to be more resilient against their economical vulnerability.

In this way, three variables related to satisfaction, "satisfaction with academic choice", "satisfaction with academic achievement" and "satisfaction with financial situation", and two related to the student's environment, "academic factor" and "social factor", are those that conform the different profiles of students with the intention of dropping out of the degree programme.

Satisfaction with academic achievement is another of the variables that play a role among the reasons for considering dropping out. In this sense, the results obtained are in line with the scientific literature that highlights the predictive power of academic achievement on dropout (Albreiki et al., 2021; Bustamante & García-Bedoya, 2021; Casanova et al., 2021; Marôco et al., 2020; Scheunemann et al., 2022).

Another satisfaction variable that has been shown to be a reason for the dropout approach is satisfaction with the financial situation, especially in the group with the lowest dropout intentions (fairly satisfied students). A lot of investigations have highlighted the importance of this variable in relation to university studies. From this point of view, the systematic review by Behr et al. (2020) reports that among the economic variables that have the greatest influence on the decision to dropout are state funding policy and the compatibility of studies and work. On the other hand, several authors find a considerable relationship between family income and the decision to dropout (Aina et al., 2022; Cocoradă et al., 2021; Opazo et al., 2021).

Academic and social factors also have an influence on the reasons for dropping out. With regard to the first of these, it is necessary to specify that it includes both the interest for the subjects and teaching methods, as well as aspects relating to the student's involvement and understanding of the subject. The social factor, on the other hand, is composed of variables relating to the student's social integration. Both facets have been frequently related to degree dropout. In this sense, the interactionist theory of Tinto & Cullen (1973) stressed out the student-institution interaction as an explanation for dropout. This model considers the beginning of university studies as a transition composed of three phases (separation, transition and incorporation), which have to take place in both academic and social aspects. This model has subsequently been updated by Smith & Tinto (2022) and has obtained support in terms of scientific evidence that validates it (Fincham et al., 2021; Nicoletti, 2019). In this way, student integration in both dimensions, together with student satisfaction, are configured as the main reasons for considering dropout.

Limitations and Future Lines of Research

Notwithstanding the importance of the present research for the field of dropout, it is necessary to emphasise that its results are only generalisable to those students who consider dropping out in their first two years at university. Consequently, it would be very useful to replicate the research using a sample of students from higher grades and compare the findings with those presented here.

Other researchers have confirmed the longitudinal nature of the phenomenon studied once it has occurred; consequently, the present research team will soon test the hypothesis that the

reasons for considering dropping out also vary according to the year in which the students are in.

Conclusion

The present research, with the statistical analyses presented, determines the importance perceived by the students in terms of the reasons that cause them to consider dropping out of the degree programme. It has been observed that satisfaction with the academic choice is the most relevant motive, acting as a classifying variable in the decision tree and allowing students to be classified into four profiles (dissatisfied, indifferent, moderately satisfied and fairly satisfied).

The importance that this variable has been shown makes it necessary to improve the processes of guidance, supervision and tutoring in order to prevent students from dropping out of university. For this purpose, it is necessary to reinforce prior academic guidance, providing Secondary Education Centres with sufficient guidance mechanisms to ensure that their students make the right vocational choice. The data also support the recommendation to implement welcome days that both instruct students in learning techniques (in order to improve their achievement) and promote their effective academic and social integration. These days can be key, as the experience that new students have during the first few days can determine their motivation and continuity (Gil-Albarova, 2019).

In addition, once students are in the university system, the need to improve tutorial action plans is evident, promoting university tutorials. These tutorials fulfil a function of guidance and support, individually or in groups, during the whole university process (Benites, 2020). In this way, they allow students to have a reference teaching figure to whom they can consult when they detect problems in a wide range of aspects related to university life, from academic/institutional to social.

Finally, it should be mentioned that a considerable proportion of students have to combine studies and work, which is why it is essential to implement public policies. An inequitable university system is one that discriminates against students with a lower economic level (Guerrero & Soto, 2019), so preventing university dropout becomes one of the main challenges for all countries.

Acknowledgments

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