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Prediction analysis of academic dropout in students of the Pablo de Olavide University

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Academic dropout among university students represents one of the problems faced by educational systems. This preliminary study presents an approach to the phenomenon of academic failure at the Pablo de Olavide University in Spain through the determination of the factors linked to students continuing with their studies, and the subsequent establishment of risk groups. The study consisted of applying an instrument to diagnose the risk of academic dropout among a sample of 70 students from the Pablo de Olavide University (from now on, UPO). The instrument was applied at the beginning of the second semester. Unlike the objective posed by the aforementioned authors (the search for factors linked to students continuing their university studies), the use that we made of the survey was to predict non-persistence (dropout). The average overall score achieved for all of the items allows us to confirm that the student population surveyed seems to be more oriented to continuing with their studies than dropping out, although 15.71% of them show a high risk of dropping out, and most notably more than half of those taking a degree in Business Studies present this high level of risk. In the case of the UPO students the direct associations between the independent variables regarding the dependent variable were present in all of the factors (attitude and behavior, commitment, socio-economic background, and motivation) with a value of p lower than 0.05. Comparing these data to those obtained with students from different universities in Andalusia, it was found that the risk groups of UPO students are less inclined to dropping out than those from other universities, and their level of commitment is lower, although their attitude and behavior are somewhat better. Finally, socio-economic background is a less significant factor for UPO students.

KEYWORDS

higher education, academic dropout, risk factors, academic persistence, prevention academic dropout

Introduction

This predictive analysis of academic dropout among UPO students allows us to design prevention programs that should take into account all actions aimed at improving commitment, attitude, and behavior.

Academic dropout in higher education

In universities, where the nature of training is very specific, over the last few years a profound transformation process has taken place as the construction of the European Higher Education Area (EHEA) has forced these institutions to accept a series of reforms aimed at renovating both the curricular structure of its studies and the methodological principles which guide and orient the teaching and learning processes.

The introduction of European credits (ECTS), the design of new study plans, the reorganization of degrees, and the professional nature of objectives have been among some of the main measures taken as a consequence of the aforementioned curricular reform. Moreover, the methodological renovation boosted in this context tends towards updating the traditional roles and functions of the institution, through original didactic methods and procedures which are more attractive for students, which arouse their interest and allow them to construct their own knowledge, grating them a more active, responsible and autonomous role in the teaching and learning process.

In the context of renovation, academic dropout must necessarily be the subject of research, as a university that wishes to attain levels of excellence needs to incorporate, along with all the necessary curricular reforms, measures to increase the rates of academic success and to avoid dropout. Reducing levels of dropout requires a profound knowledge of this phenomenon, which necessarily implies investigating the causes of this problem at all levels (institutional, educational, social and economic).

The personal, economic and social effects of academic dropout have been denounced in numerous studies (Lizarte, 2017; Fernández Cruz et al., 2020), they represent such a serious problem that they have led to the publication of official reports by the authorities of different countries. In the case of Spain, the data from 2021 show that university dropout affects almost a quarter (21.2%) of students who start a degree (Subdirección General de Actividad Universitaria Investigadora de la Secretaría General de Universidades, 2022).

According to Bernardo et al. (2015), among the many studies developed about this Question, those which stand out are those aimed at establishing a predictive model for university dropout, since the enormous individual and institutional cost makes this extremely relevant. This is particularly true at times of economic crisis, as we cannot ignore the fact that behind the problem of academic dropout lies the economic cost for the government of providing a public university system.

University dropout acts as a selection process in higher education as well as functioning as a measurement of the academic performance of the student and, ultimately, as a demonstration of the effectiveness of the education system in general (Feixas et al., 2015). In this regard, the low levels of graduation on some degrees and at some universities generates a problem that goes beyond universities themselves and worries educational authorities. It therefore has important social consequences, and is a barrier to the economic development of those countries whose growth depends to a great extent on the high level of qualification demanded by a labor market that is changing at high speed (Munizaga et al., 2018).

Nevertheless, there are some nuances related to this university dropout in terms of transferring it into figures. When we talk about dropout, we must distinguish between those students who do not register on any degree program for two consecutive years and have not graduated, and those who change degrees. In line with the previous point, and according to the data provided by the Ministry of Universities, at public universities (in the new entry cohort of 2015–2016) there was a total dropout of 20.8% (33.9% dropout from studying minus 13.1% who changed their degree within the Spanish University System).

These data improved significantly for the new entry cohort of 2017–2018 with a total dropout of 13% (21.3% dropout from studying minus 8.3% who changed their degrees).

Although these figures seem rather high, Spain is not far from the average situation in other developed countries. Both the rate of graduation From University Studies and that of university academic performance are at the average level for these countries (Hernández-Armenteros and Pérez-García, 2019; Ministerio de Educación y Formación Profesional, 2020).

The main consequence of the growing academic interest in student dropout has been the enormous proliferation of research over the last decades, and as pointed out by González-Ramírez and Pedraza-Navarro (2017), this research either focuses on quantifying dropout, on constructing and validating models to explain it, or on identifying the factors associated with this phenomenon.

Factors involved in university dropout

Among the different explanatory models of university dropout, one of the most widely accepted is the one developed by Tinto (1975), which links persistence in Studies with interaction between the specific characteristics of students and universities.

The concepts of "retention" and "persistence" were then further explored by this same author (Tinto, 2012) to differentiate the rate of students that graduate at a higher education institution over a number of years, in comparison to the action which is the responsibility of the individual in order to complete their university studies, but analyzing this question from a holistic perspective, considering higher education as a whole and not with reference to a specific

institution. With regard to this last factor, what is of interest is to analyze what are the factors that on a systemic level influence persistence, because dropout tends to be lower at the university as a whole than if we analyze the problem in a particular faculty (since it is common for students to drop out of a particular degree to start another one, or to temporarily leave their studies for family and/or professional reasons, but then finish these degrees once the personal circumstances are right).

In this regard, most of the studies which have analyzed university dropout tend to agree on a series of explanatory factors: individual ones, those related to the interaction of the student with the university, and those attributable to the institution itself. Other studies have pointed out the predictive capacity of the academic performance displayed in the first year of university studies (Casanova et al., 2018; Rodríguez-Muñiz et al., 2019; Pellagatti et al., 2021). Indeed, according to González-Campos et al. (2020), the main risk of dropout occurs at the beginning of a degree.

Triadó et al. (2015) and Lizarte (2017) have analyzed the causes of persistence or dropout from university studies, classifying them into the categories of psycho-educational, educational, biographical, socio-economic, pedagogical, and vocational.

All of the studies agree on the multi-causal origin of these phenomena. No single, isolated cause appears to be the origin of dropout, but instead there are several causes that coincide in individuals who have to abandon their studies.

The attitude of persistence with studies and its relation to academic satisfaction has been studied by Urbina and Ovalle (2016), in relation to basic competences by Fernández-Cruz and Gijón (2012), and in relation to psychological resilience by Lightsey and Boyraz (2011).

In general, we can state that the variables which most influence dropout are those of an individual nature, related to the characteristics of students or their family background, followed by the variables related to the degree that they study. The variables related to the university in which they study have the least influence.

Persistence versus dropout at Pablo de Olavide University

Starting from the premise that it is essential to study academic failure in higher education as one of the basic questions to be addressed when planning more coherent educational policies, we present in which we have tried to dropout at Pablo de Olavide University (UPO in Spanish initials), the newest public university the nine that currently exist in the Autonomous Community of Andalusia in Spain, and which was founded in the province of Seville in 1997.

It is an institution which was designed as single campus by integrating into the same space all of its centers and services, and therefore its social, teaching, research, residential, and sporting functions all take place in the same geographical space.

It has approximately 11,000 students and 7 teaching centers on its campus, which is situated on the outskirts of the city of Seville: the faculties of Business Studies, Experimental Sciences, Sports Sciences, Social Sciences, Law, Humanities, and Higher Polytechnic School, as well as an affiliated center called San Isidoro, which is in the city itself.

This university offers a wide variety of degrees, double degrees, and postgraduate studies in fields such as Legal Sciences, Social Sciences, Humanities, Biotechnology, Environmental Sciences, Sports Sciences, and Computer Engineering, and in general terms it is worth highlighting the growing interest in bilingual education in the different areas of knowledge, which is reflected not only in the contents of some its double degrees but also in the fact that it offers the only official double degree in German-Spanish Law that exists in Spain, taught jointly with the University of Bayreuth.

In line with this previous point, we can also highlight the university's strong commitment to internationalization, which thanks to its collaboration with higher education institutions in over 35 countries, allows students to carry out studies and specialized internships on an international level.

In terms of its attention to students, Pablo de Olavide University includes within the sphere of action of its Vice-Rectorate for Students a space called the Area for Administrative Management and Assistance for Undergraduates.

This area includes three spheres of action related to academic and professional guidance, access and admission to the University, grants and final assistance for studies. The Guidance and Access Unit, aimed both at future students and at those who are already taking a degree at the institution, offers different services among which we can highlight:

The welcome program

This is held on the days before classes start each academic year, and is aimed at first-year students in order to provide them with relevant information before the classes start, as well as offering their first contact with their future classmates, participation in different activities to facilitate their integration at the University, attendance at informative sessions about the different degrees and the teacher who give classes on them, University services, visits to the different campus facilities.

The guide program

This consists of accompanying and/or offering tutorial support to students, either from a teacher who is also a tutor, or from a classmate offering peer tutorial support. This program is also used to boost the academic development of those students who have special needs and require educational support.

Encouragement of associations

This initiative aims to encourage the creation of Student Associations whilst also trying to contribute to the consolidation

of those that already exist, so as to boost and disseminate association activities among university students.

Materials and methods

Objectives

This study is part of the research project on academic dropout at Andalusian universities, funded by FEDER.

In the study, we analyze the main factors related to academic persistence/dropout among students at the Pablo de Olavide University. A predictive perspective is adopted which allows us to identify risk groups and establish suitable recommendations to implement the corresponding measures to prevent dropout.

Process

Our study consisted of applying an instrument to diagnose the risk of dropout from university studies from a sample of first-year students at the Pablo de Olavide University. It was carried out at the beginning of the second semester so that students would have had 6 months of experience. The questionnaire was applied to complete groups of students whose teachers expressed interest in collaborating in our research. The distribution was based on convenience with a non-probabilíty sample.

Participants

We applied the instrument of diagnosis to 70 first-year students at the Pablo de Olavide University. There were 42 female students (60%) and 28 male students (40%). Regarding the faculties in which they studied, 6 of them were from Sports Sciences (8.57%), 32 from Business Studies (45.71%), 7 were from Experimental Sciences (10%), 20 from Law (28.57%) and the other 7 were from Humanities (7.14%).

Instrument

In order to identify those students who show some risk of dropout, we used the "Survey on Successful Student Retention" by Velázquez and González (2017), which the Authors applied to a group of nursing students From the Matamoros Multidisciplinary Academic Unit at the Autonomous University of Matamoros in Mexico. A slight modification was made in the wording of some items in the survey to adapt it better to the reality of Spanish students, and two of the 73 initial items were eliminated as we considered that they were not applicable to our context. In its final wording, the survey had 71 items on a 5-point Likert scale on which students could express to what extent they agreed or

disagreed with the opinion offered, along with 6 questions aimed at the socio-demographical identification of the students.

We consider that survey on persistence at university can be of great use to identify risk groups Depending on the to which the factors related to persistence are present in a student, we consider that they belong to a risk group and that measures should be taken to improve the persistence-related factors and decrease the predictive factors of dropout.

The original survey established four factors and 12 categories that explain persistence in university studies: motivation, commitment, attitude and behavior, and socio-economic background, as below in Supplementary Table S1.

Contrary to objective proposed by these authors (the search for factors associated with the persistence of university students), we used the survey to predict non-persistence (dropout).

Results

Persistence of students at the Pablo de Olavide University

Unlike the results obtained by Velázquez and González (2017), whose study did not identify any significant correlation between motivation and persistence, in the case of UPO students there were direct associations between the independent variables in relation to the dependent variable for all of the factors (attitude and behavior, commitment, socio-economic background, and motivation) with a value of p lower than 0.05 (Supplementary Table S2).

These independent variables (factors) are interrelated to different degrees because, as we can see in Supplementary Table S3, the strongest association is between Attitude and Behavior and Socio-economic Background (significant to 0.01) and the weakest is between Motivation and Socio-economic Background (non-significant) (Supplementary Table S3).

Risk elements for dropout

Analyzing the results obtained from the sample, the average overall score achieved for all of the items is 3.58. That means that the student population sampled seems more inclined to persistence than dropout.

Nevertheless, 14 items did not reach the average score of 3.00, i.e., this indicates a certain level of dissatisfaction with their personal situation on the degree program. These elements are shown in Supplementary Table S4.

Risk group

In order to determine which students are more likely to drop out (what we call risk groups), we have decided to include those

students who did not reach an average score of 3.00 in the sum total of 71 items.

There were 11 students who did not reach this average score of 3.00, which represented 15.71% of the sample. The average overall score of this group for the set of all items was 2.36. Of these 11 students, 5 were female and 6 were male; 2 were studying Experimental Sciences, 6 were taking Business Studies, 2 were studying Law and 1 was studying Sports Science.

The characteristics of this risk group are shown in Supplementary Table S5.

Supplementary Table S6 shows the items with the highest scores for students at risk, i.e., the items that indicate a tendency towards persistence since they score higher than 3.00. There 14 from a total of 71 items.

Most of these items correspond to the motivation and commitment of students, and to a much lesser extent, to their socio-economic background.

While in the sum total of the sample there were only 14 items with an average score lower than 3.00 and 57 items that scored over 3.00, in the risk group exactly the opposite happened (14 items with an average score higher than 3.00 and 57 with an average score lower than 3.00).

Supplementary Table S7 shows the items with the lowest scores for students at risk, which should guide the measures proposed to improve this situation. There were 18 that corresponded to the dimensions of commitment (9), attitude and behavior (4), persistence (3), socio-economic background (1) and motivation (1) (Supplementary Table S7).

Supplementary Table S8 shows the comparison between the general sample and risk group for those low-scoring dimensions.

This would suggest that the measures aimed at avoiding dropout for the general group should focus on improving the commitment and motivation of students, whereas for the risk group they should focus on commitment, and attitude and behavior.

Comparing these data with those obtained by Álvarez Ferrándiz et al. (2022), for a sample of 976 students from different Andalusian universities, it can be observed that risk group of UPO students are less inclined to drop out than those from other universities (25% of the items from the questionnaire compared to 39.44%), their level of commitment is lower (50% compared to 28.57% of low-scoring items for the dimension of commitment), although their attitude and behavior was notably better (22.22% compared to 42.83% of low-scoring items for this dimension) and, finally, the socio-economic background of these students was a less significant factor (5.56% compared to 10.71%).

Moreover, unlike the study carried out by Fernández-Mellizo (2022) which concluded that students from a lower socio-economic background have a higher probability of dropout than those from a higher socio-economic background, in the case of UPO students this variable had very little importance for the risk group (5.56%). These variables with the least significance are defined as micro-impacts in terms of their influence on academic performance (Tuero et al., 2018).

In general, the variables with the greatest influence on dropout are those of an individual nature, related to the characteristics of the students or their family background, followed by those variables related to the degree they study. The variables related to the university where they study have the least impact.

Measures to prevent dropout

Carrying out a predictive analysis of academic dropout among students at Pablo de Olavide University would not make any sense if measures were not also proposed to prevent this problem.

However, in addition to the analysis offered, attention must be paid as soon as possible to the initial performance of students, since poor performance in the first year is a warning sign of a possible dropout.

In the specific case of students in the risk group at Pablo de Olavide University, the prevention programs should primarily focus on measures to improve commitment as well as attitude and behavior.

In this regard, it is probably of interest to consider the need for career guidance, fundamentally before choosing a degree so that students relate the expectations and objectives with which they choose a specific degree with its academic reality and its career prospects.

Along with this measure, it would be advisable to provide training in study techniques and habits aimed at developing basic strategies to improve academic performance. In this sense, we agree with Fernández-Mellizo (2022) who states that universities should develop special internal programs for those students most at risk of dropout. These programs should combine two elements: support programs to improve performance and, in the case of students with economic problems, reinforce economic assistance so that, among others, the cost of studying is not the reason why they drop out.

The need for these support programs is even more evident in the case we have studied because the lowest scores for UPO students correspond to two items related to the activity of tutors (Supplementary Table S4).

We also agree with Bernardo et al. (2015) that, in terms of boosting the roles of guidance and tutorials, it is essential to consider that the needs of students vary over time: before starting at university, they will need some basic guidance to decide their future careers, and this guidance will be different once they are at university. The demands made by those who have just started their studies will be different, as they will need more measures aimed at familiarizing them with their degree program to acquiring learning strategies and the habit of attending class. And the needs of those who are in the middle and/or near the end of their studies will also be quite different, as they require guidance about their future careers and the employment prospects of the degree they have chosen.

These programs to prevent dropout should be a constant presence throughout university studies, and could perhaps be offered by a specific department that would accompany students throughout their university education and not only at the

beginning. Attention to psychological, and social and affective problems, which can lead directly to the decision to drop out of university studies, may be offered in alternative ways by this department through the organization of workshops on personal development, mindfulness, etc. Essentially, this department should accompany students to help them find solutions for the difficulties that they will face over the course of their university education.

Conclusion

The results obtained in this study allow us to determine which students have the greatest risk of dropout and, at the same time, they also facilitate the design of prevention programs.

In terms of the limitations of the study, we must acknowledge the reduced size of the sample of those who agreed to participate. For this reason, we consider it necessary to establish future lines of research which can explore these questions in greater depth and with larger sample sizes. It would also be very positive to monitor the academic performance of these students throughout their degrees since other factors might appear which could increase dropout.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

This research has been approved by the Research Ethics Committee of the University of Granada with registration number 2778/CEIH/2022. The patients/participants provided their written informed consent to participate in this study.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2023.1083923/full#supplementary-material

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