Stories of abandonment. A biographical-narrative approach to the academic dropout in Andalusian Universities. Multicausal analysis and proposals for prevention

Edited by
Antonio Hernandez Fernandez and Manuel Fernández Cruz

Published in
Frontiers in Education

About Frontiers

Frontiers is more than just an open access publisher of scholarly articles: it is a pioneering approach to the world of academia, radically improving the way scholarly research is managed. The grand vision of Frontiers is a world where all people have an equal opportunity to seek, share and generate knowledge. Frontiers provides immediate and permanent online open access to all its publications, but this alone is not enough to realize our grand goals.

Frontiers journal series

The Frontiers journal series is a multi-tier and interdisciplinary set of open-access, online journals, promising a paradigm shift from the current review, selection and dissemination processes in academic publishing. All Frontiers journals are driven by researchers for researchers; therefore, they constitute a service to the scholarly community. At the same time, the *Frontiers journal series* operates on a revolutionary invention, the tiered publishing system, initially addressing specific communities of scholars, and gradually climbing up to broader public understanding, thus serving the interests of the lay society, too.

Dedication to quality

Each Frontiers article is a landmark of the highest quality, thanks to genuinely collaborative interactions between authors and review editors, who include some of the world's best academicians. Research must be certified by peers before entering a stream of knowledge that may eventually reach the public – and shape society; therefore, Frontiers only applies the most rigorous and unbiased reviews. Frontiers revolutionizes research publishing by freely delivering the most outstanding research, evaluated with no bias from both the academic and social point of view. By applying the most advanced information technologies, Frontiers is catapulting scholarly publishing into a new generation.

What are Frontiers Research Topics?

Frontiers Research Topics are very popular trademarks of the *Frontiers journals series*: they are collections of at least ten articles, all centered on a particular subject. With their unique mix of varied contributions from Original Research to Review Articles, Frontiers Research Topics unify the most influential researchers, the latest key findings and historical advances in a hot research area.

Find out more on how to host your own Frontiers Research Topic or contribute to one as an author by contacting the Frontiers editorial office: frontiersin.org/about/contact

Stories of abandonment. A biographical-narrative approach to the academic dropout in Andalusian Universities. Multicausal analysis and proposals for prevention

Topic editors

Antonio Hernandez Fernandez — University of Jaén, Spain
Manuel Fernández Cruz — University of Granada, Spain

Table of contents

Editorial: Stories of abandonment. A biographical-narrative approach to the academic dropout in Andalusian Universities. Multicausal analysis and proposals for prevention

Manuel Fernández Cruz[1] and Antonio Hernández Fernández[2]*

[1]University of Granada, Granada, Spain, [2]University of Jaen, Jaén, Spain

Editorial on the Research Topic
Stories of abandonment. A biographical-narrative approach to the academic dropout in Andalusian Universities. Multicausal analysis and proposals for prevention

The monograph "Dropout Stories" addresses the problem of university dropout in Andalusia from multiple perspectives, including qualitative and quantitative research. Much of the research included has its origin in the research project financed by the EU ERDF funds that was coordinated from the University of Granada between 2018 and 2021 and from which products were obtained that are reported in the various contributions such as literature reviews, results of application of surveys, collections of personal histories of students, diagnosis of risk groups and analysis of prevention measures designed by universities to alleviate the serious personal, social and economic consequences of the phenomenon.

As many authors have done before in different contexts, the main goals of the research are to understand in depth the causes that lead Andalusian university students to drop out of their studies, considering the effect of the factors involved (Behr et al., 2020) such as financial policy, the educational quality of the institutions and others related to the students themselves (educational background or study ability), in order to be able to predict and prevent this situation. The research also aimed to develop concrete proposals for reorienting educational policies and training models to mitigate the predictors of academic dropout (Richardson, 2005) and to strengthen persistence in studies (Nieuwoudt and Pedler, 2023).

The aims of this Research Topic of articles include gathering up-to-date data on the scale and evolution of academic failure in recent years, examining the measures adopted so far by universities to tackle the problem, reconstructing the biographical

trajectories of students who have dropped out in order to identify similarities and differences in their experiences, and carrying out an in-depth analysis of the personal, social, economic, and educational triggers of student dropout with the essential aim of preventing it in order to mitigate its consequences (Von Hippel and Hofflinger, 2021).

Researchers such as Reynolds and Cruise (2020) have pointed out the importance of understanding socio-economic factors as predictors of academic dropout. Others, such as Casanova et al. (2021), have insisted on the need for screening tools to diagnose at-risk groups. Other researchers encourage the exploitation of data mining to correctly identify the phenomenon (Sani et al., 2020), and even the use of emerging methodologies in Higher Education processes, such as the LSS (Gupta et al., 2020), to address it.

In addition, our study incorporates perspectives such as those of Freire (2004), which focus on the transformative role of education. The application of innovative pedagogical models is key for Alfonso et al. (2012), author of numerous studies on university dropout in Latin America. Valenzuela and Yáñez (2022), an expert in educational inclusion policies, has worked on concrete proposals for dropout prevention that will be useful for this study. This study seeks to support public policy proposals, pedagogical and institutional models for the early detection and reduction of this problem, in line with Valenzuela and Yáñez (2022).

The Research Topic addresses the problem of university dropout from multiple perspectives. Several articles analyze the factors associated with dropout based on surveys and focus groups with students who have dropped out. Others conduct systematic reviews of the existing literature on the causes and proposals to reduce this phenomenon. Some articles test psychometric instruments to detect the risk of dropout or apply these tools to specific universities in Andalusia. Biographical accounts of students who have dropped out of university are also included. Other papers review the state of dropout in the general context of Spain or analyze particularities in teaching careers. One article specifically addresses the use of neurodidactics in vulnerable groups. Finally, one paper concludes the Research Topic by systematizing the determinants of university dropout according to the literature.

The article "Incident factors in Andalusian university dropout: a qualitative approach from the perspective of higher education students" identifies the factors that influence dropout through a focus group with twelve students who dropped out of the University of Malaga (Santos-Villalba et al.). It concludes on the importance of aligning educational policies with the real needs of students.

The study "School dropouts in Spain: a systematic review" reviews 28 studies on school dropouts in Spain since 2010, analyzing the areas of knowledge addressed, the research institutions and the proposals for prevention (Berral-Ortiz et al.). It concludes that there is a need for further research on this phenomenon in Spanish institutions. The article serves to connect the phenomenon of dropout in Higher Education with the basic and widespread problem of school dropout.

The study "Prediction analysis of academic dropout in student of the Pablo de Olavide University" uses a survey of 70 students to determine the factors linked to student permanence at the UPO,

establishing that 15.71% of those surveyed have a high risk of dropping out (Cuevas López et al.).

The article "The impact of dropout at the University of Granada and proposals for prevention" shows the application of a dropout risk diagnosis instrument to 642 first-year students at the University of Granada, identifying a risk group of 20 students for which preventive measures of a pedagogical and didactic nature are proposed (González-González et al.).

The article entitled "Multicausal analysis of the dropout of university students from teacher training studies in Andalusia" analyses the reasons for dropout in a sample of 608 students from initial teacher training programmes in six Andalusian universities (Ibáñez-Cubillas et al.). The results reveal that the majority wish to persist in their studies, although some express difficulties for continuity.

The article on "Psychometric properties of a dropout prediction tool for students in Andalusia" analyses the psychometric properties of a scale applied to 970 students from 6 Andalusian universities, forming a valid and reliable instrument for the prediction of dropout (Hernández-Fernández et al.).

For its part, the article entitled "Dropout stories of Andalusian university students" recovers 22 biographical accounts of students who dropped out of Andalusian universities, analyzing them to characterize paradigmatic cases of desertion according to psychological, social, economic, pedagogical and institutional dimensions (Gijón et al.).

The article "Causes of academic dropout in higher education in Andalusia and proposals for its prevention at university: A systematic review" identifies 25 studies on causes and proposals for reducing university dropout, concluding that the main reasons are related to poor academic performance, lack of social support, economic problems and demotivation (de la Cruz-Campos et al.).

The contribution entitled "Neurodidactic teacher training program for educational dropouts in vulnerable groups" proposes the use of neurodidactics in vulnerable groups and analyses key aspects to be incorporated into university teacher training in order to implement effective programmes with this innovative methodology (de Barros Camargo et al.). The contribution emphasizes motivation and brain functioning in learning processes. It analyses which aspects should be included in teacher training in order to develop neurodidactic intervention programmes aimed at reducing educational dropout. The results allow us to determine the knowledge of university teachers about neuroscience and neurodidactics.

The study on "Factors contributing to university dropout: a review" systematizes five groups of determinants of university dropout: student adjustment, personality, socio-economic status, teacher-student relationship and quality of higher education (Lorenzo-Quiles et al.).

Finally, the study entitled "Dropout in Andalusian universities: prediction and prevention" tests an instrument for the early detection of dropout risk applied to students at three Andalusian universities (Fernández Cruz et al.). With a sample of 976 students, a group of 34 at risk was identified. The extension of this screening instrument to the whole university system can help universities to apply personalized preventive measures.

In summary, the compilation provides field research, testing of predictive instruments, systematization of causes at a theoretical level and concrete proposals for tackling this problem that affects thousands of Andalusian students every year. The multiplicity of approaches enriches the understanding of the phenomenon and provides a solid basis for recommendations for its prevention.

Ethics statement

This research has been approved by the Research Ethics Committee of the University of Granada with registration number 2778/CEIH/2022. This research is under the authorization of the ethics committee of the University of Jaén, with reference JUL.22/4.

Author contributions

MF: Conceptualization, Methodology, Project administration, Supervision, Writing—review & editing. AH: Conceptualization, Writing—original draft.

Funding

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.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

Alfonso, M., Bos, M. S., Duarte, J., and Rondón, C. (2012). "Panorama general de la educación en América Latina y el Caribe," in *Educación para la transformación (Chapter 1)*, eds. M. Cabrol and M. Székely (Banco Interamericano de Desarrollo).

Behr, A., Giese, M., Teguim Kamdjou, H. D., and Theune, K. (2020). Dropping out of university: a literature review. *Rev. Educ.* 8, 614–652. doi: 10.1002/rev3.3202

Casanova, J. R., Gomes, C. M. A., Bernardo, A. B., Núñez, J. C., and Almeida, L. S. (2021). Dimensionality and reliability of a screening instrument for students at-risk of dropping out from higher education. *Stud. Educ. Eval.* 68:100957. doi: 10.1016/j.stueduc.2020.100957

Freire, P. (2004). *Pedagogía de la autonomía: Saberes necesarios para la práctica educativa.* Sao Paulo: Paz e Terra.

Gupta, S. K., Antony, J., Lacher, F., and Douglas, J. (2020). Lean Six Sigma for reducing student dropouts in higher education–an exploratory study. *Total Quality Manag. Bus. Excell.* 31, 178–193. doi: 10.1080/14783363.2017.1422710

Nieuwoudt, J. E., and Pedler, M. L. (2023). Student retention in higher education: why students choose to remain at university. *J. College Student Retent.* 25, 326–349.

Reynolds, J., and Cruise, S. (2020). Factors that influence persistence among undergraduate students: An analysis of the impact of socioeconomic status and first-generation students. *Interchange* 51, 199–206. doi: 10.1007/s10780-020-09408-y

Richardson, J. T. (2005). Instruments for obtaining student feedback: a review of the literature. *Assess. Eval. Higher Educ.* 30, 387–415. doi: 10.1080/02602930500099193

Sani, N. S., Nafuri, A. F. M., Othman, Z. A., Nazri, M. Z. A., and Mohamad, K. N. (2020). Drop-out prediction in higher education among B40 students. *Int. J. Adv. Comput. Sci. Applic.* 11:550. doi: 10.14569/IJACSA.2020.0111169

Valenzuela, J.P., and Yáñez, N. (2022). *Trayectorias y políticas de inclusión en América Latina y el Caribe en el contexto de la pandemia.* CEPAL, UNESCO.

Von Hippel, P. T., and Hofflinger, A. (2021). The data revolution comes to higher education: identifying students at risk of dropout in Chile. *J. High. Educ. Policy Manag.* 43, 2–23. doi: 10.1080/1360080X.2020.1739800

School dropouts in Spain: A systematic review

Blanca Berral-Ortiz[1]*, Magdalena Ramos-Navas-Parejo[1], Fernando Lara-Lara[1] and Natalia Moreno-Palma[2]

[1]Department of Didactics and School Organization, University of Granada, Granada, Spain,
[2]Department of Didactics of Mathematics, University of Granada, Granada, Spain

Dropout is a phenomenon that is unfortunately occurring worldwide and is of increasing concern to authorities. It is a reality that quality indicators in many models are affected by the number of students who drop out of school at higher levels. However, this is not only reflected at the educational level, but also affects the social and personal development of young people. The analysis of school dropout among young Spaniards is a topic of interest due to the repercussions it generates in social, personal, and institutional spheres. The objectives of this study were to analyse how many studies have been published on the subject since 2010, locating the selected articles in areas of knowledge and studying the institutions where the research has been carried out. On the other hand, it has been observed how many studies have been focused on the search for the reasons that lead to high dropout rates and the main factors. Finally, an attempt has been made to analyse how many of them are aimed at solving the problem and preventing early school leaving in primary education in order to avoid drop-out at higher levels, by examining the proposals established to reduce the problem. In order to achieve the proposed objectives, a systematic review was carried out with the aim of carrying out a rigorous analysis of the existing and relevant scientific literature on the subject. After applying various exclusion and inclusion criteria, eliminating duplicate records and analysing the works in depth, 28 articles were selected. The results suggest that, currently, despite the problems caused by early school leaving, it is not a subject that has been widely studied and that the main causes are due to educational and social reasons. In the same context, of the articles selected, only 12 present different proposals for the prevention of early school leaving. In the light of the above, it is necessary to look more deeply into the nature of early school leaving in Spanish institutions.

1 Introduction

Providing quality education is one of the main objectives of the Spanish educational system. The current interest in improving the quality of education is the result of a progressive compilation of initiatives, policies, plans and programs dating back to the 1980s (Llorent-Bedmar and Cobano-Delgado, 2018).

The Organic Law for the General Organization of the Educational System of 1990 proposed for the first time the general evaluation of the educational system as a factor favoring the quality of education, establishing a policy for its evaluation. Subsequent education laws retained, expanded, and specified this type of initiative (Tiana-Ferrer, 2018).

In order to evaluate an educational system and quantify the quality of education, it is necessary to select those aspects that characterize it. These elements, which concisely provide relevant information on the education system, will be the indicators that allow the evaluation of its different dimensions, as well as comparison with education systems in other countries (García, 2016). At present, the State System of Education Indicators (SSEI) (MEFP, 2021) establishes 21 indicators grouped into three dimensions: schooling and educational environment, educational financing and educational results.

One of the educational performance indicators used to evaluate the Spanish educational system, collected by the SSEI since its 2004 edition, is the early school dropout rate (MECP, 2004). In the most current edition of 2021, this indicator is defined as the percentage of persons aged 18–24 whose highest level of education is at most the last year of compulsory secondary education and who are not in any form of education or training (MEFP, 2021).

However, in the literature we can find different definitions of the concept of Early School Dropout (ESD), some of which are more specific and depend on the educational system of each country, while others are more general definitions aimed at facilitating international comparisons (Rizo and Hernández, 2019). In general, the difference lies in the age at which school dropout occurs and the minimum educational level attained. It is important to consider the various definitions of school dropout when comparing the rates of this indicator, as well as possible sampling errors.

According to the definition of the Statistical Office of the European Union (Eurostat, 2022), Spain is among the countries with the highest rate of early school dropout compared to the countries participating in the statistical study.

Although the ESD rate has decreased year after year and its trend is to continue decreasing, the data collected in 2021 show an 11.4% ESD rate. Spain is three points above the European Union average (8.4%) and does not exceed the European target of keeping the rate below 10%.

On the other hand, analyzing the latest data provided by the SSEI for 2020, the ESD rate has been decreasing to reach 16% in 2020. The rate is still above the European Union average of 9.9% and remains far from the European target of 10% for the year.

Both Eurostat and the SSEI offer data collected by region, which show that early school dropout is not distributed homogeneously throughout Spain. Analyzing the data by region, Figure 1 shows the high rates of ESD in most of Spain (Eurostat, 2022).

Similarly, analyzing the data provided by the SSEI, in 2020, the regions with the lowest dropout rate (less than 9.1%) are País Vasco, Principado de Asturias and Cantabria. Comunidad de Madrid, Comunidad Foral de Navarra, Galicia, Aragón, and La Rioja have values between 10 and 15% and Ceuta, Melilla, Andalucía, and Illes Balears exceed 21% ESD (MEFP, 2021).

After observing Spain's position in the European rankings and the heterogeneity of the figures that appear in the different regions of the country, it makes sense to consider which agents influence the processes of early school dropout and what could be the possible actions to improve this situation.

Early school dropout is a problem influenced by many factors and with very diverse origins. The individual's motivation, personal effort, capabilities, or socio-family support are internal causes that affect ESD (Hernández and Alcaraz, 2018). From an external perspective, the causes that intervene in this phenomenon may be the social environment, gender, ethnicity, nationality, economic situation, or school context, among others (Romero and Hernández, 2019).

The treatment of ESD is a complex challenge that must consider many dimensions in order to carry out multidisciplinary intervention programs from a global and integral perspective (González-Rodríguez et al., 2019). The main actions carried out by different countries include increasing the flexibility and permeability of educational pathways, improving educational and vocational guidance, improving teacher training for diversity, creating positive learning environments, and promoting inclusion (Eurydice, 2014).

In light of the theoretical contributions analyzed in this research, the objective is to analyze the studies that deal with school dropout in Spain. Determining the causes or reasons that lead to it and the most recommended actions that can be carried out to prevent it from occurring, thus reducing the high percentage that is registered in Spain.

The research questions that, together with this main objective, guide the present study are the following:

RQ1: How many studies have been published since 2010 on this topic?
RQ2: In what areas of knowledge are the studies on this subject framed?
RQ3: Which institutions have developed this research on school dropout in Spain?
RQ4: How many studies have focused on the reasons for the high dropout rates in Spain? What are the main factors that lead to this?
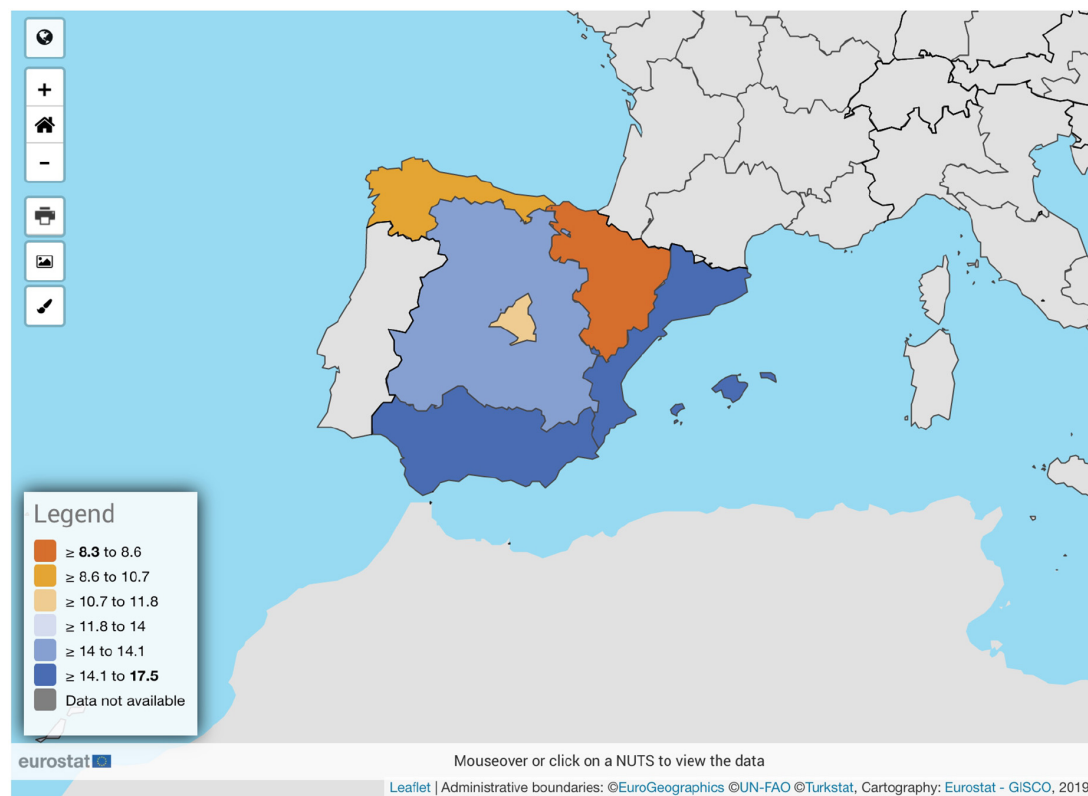
FIGURE 1
Early school dropout in Spain by region (Eurostat, 2022).

RQ5: How many studies are specifically aimed at preventing and solving this problem? What do they propose to reduce school dropout rates?

2 Methodology

Finally, an attempt has been made to analyse how many of them are aimed at solving the problem and preventing early school leaving in primary education in order to avoid it at the higher levels, examining the proposals put in place to reduce the problem.

The review process was carried out in two phases: the first was devoted to planning and the second to action (Ramos-Navas-Parejo et al., 2020; Romero-Rodríguez et al., 2020). During the planning stage, the research objectives and questions were defined, the inclusion and exclusion criteria were selected based on the intention of this work, the most appropriate descriptors were chosen, which were found within Eric's thesaurus, and the databases where the search for documents would be carried out.

In the action phase, the literature was surveyed and the results were refined in order to extract the most relevant content in accordance with the study criteria and, finally, to represent them.

The inclusion and exclusion criteria, were chosen according to the research objectives and questions and in accordance with the premises of the PRISMA statement (Moher et al., 2009). According to the inclusion criteria, we selected journal articles, documents published from 2010 onward, which had been carried out in Spain and which dealt with the study topic: school dropout in Spain. With respect to the exclusion criteria, non-peer-reviewed documents, literature prior to 2010, not published in Spain and whose study topics did not directly concern school dropout were discarded.

2.1 Search strategy

The search strategy was carried out within two of the most important international databases of scientific documents: Web of Science (WoS) and Scopus. The selection criteria were based on the quality of the articles indexed in them and their broad scope.

The most appropriate descriptors were selected to define the purpose of this study, which were checked to ensure that they were indexed in Eric's thesaurus, in order to ensure the use of

the most frequent keywords in scientific language. After this operation, we proceeded to carry out different search equations (Tables 1, 2). For these, the Boolean operator "and" was used and it was established that the descriptors were found in the title of the document, abstract or formed part of the keywords.

2.2 Data collection and analysis

Data collection was guided by the PRISMA protocol. Thus, the discrimination was carried out in four stages (Figure 2): the first, called identification, consisted of all the documents collected in both databases by performing the search equation represented in the previous tables (Tables 1, 2), a second stage, called selection, in which repeated documents and those identified with the exclusion criteria EX1 and EX2, were eliminated, a third stage, called suitability, in which the articles were analyzed to choose those that respond to the research objectives and questions, which are those that correspond to the inclusion criteria IN3 and IN4, reaching the last stage, called inclusion, in which all the articles that finally make up the research sample are compiled. This process was carried out during the month of September 2022.

3 Results

3.1 How many studies have been published since 2010 on this topic?

Of the 83 publications found according to the search criteria, 28 articles were selected after refining the results according to the established inclusion and exclusion criteria.

The Scopus database records a total of 18 articles, representing 64.28%, and WoS records 10 papers, representing

TABLE 1 Search strategy in the Web of Science database.

Databases	Search keywords
- WoS (Article title, abstract, and keywords)	- "School dropout," "Spain," and "Education"
- Type of document	- Article
- Time period	- Since 2010

Source: own production.

TABLE 2 Scopus database search strategy.

Databases	Search keywords
- Scopus (Article title, abstract, and keywords)	- "School dropout," "Spain," and "Education"
- Type of document	- Article
- Time period	- Since 2010

Source: own production.

35.71%. The main years of scientific production are 2010 with five articles (17.85%) and 2022 with 4 (14.28%). They are followed by the years 2014 and 2021, which each support three articles (10.71%), respectively. The third place is occupied by the years 2011, 2016, 2018, 2019, and 2020 with two articles each year, which represents 7.14% of the total. Finally, in the following years, scientific production is limited to one article (3.57%) per year: 2011, 2012, 2013, and 2015.

On the other hand, it is observed that in 2017 there are no publications in both databases, as well as in the time interval from 2012 to 2015 in the WoS database. The same situation occurs in 2019 and 2022.

3.2 In which fields of knowledge do the studies on this subject fall?

The 28 selected articles are grouped into six areas of knowledge and research according to the order of each database of journals and published articles. Both the Psychology and Social Sciences areas coincide in both classifications and appear as independent areas.

In WoS the journals and articles are sorted into 15 different possible Research Areas. The selected publications belonging to this database are distributed in three areas: Education Educational Research with seven papers, Social Sciences with two, and Psychology with one article.

On the other hand, in Scopus the journals and articles are organized into 14 Subject Areas. Those found in this database are presented in the following five areas: Arts and Humanities with one paper, Business, Management and Accounting with three, Social Sciences with 12, and Medicine and Psychology with one publication each.

Between the two databases, the area of knowledge and research in the Social Sciences is the one that collects the most articles with a total of 14 (50%), corresponding to the following: Tomás et al. (2012), Mínguez (2013), Salvà-Mut et al. (2014), González-Losada et al. (2015), Martínez et al. (2016), Gil et al. (2019), Lázaro et al. (2020), Fernández-Menor and Latas (2021), López et al. (2021), Cerdà-Navarro et al. (2022), Rodríguez-Izquierdo (2022), Sánchez-Lissen (2022), Mora and Oreopoulos (2011), and Amer (2011). In second place is Education Educational Research with seven articles, in third place Business, Management and Accounting with three, and finally Psychology with two papers.

3.3 Which institutions have carried out this research on early school leaving in Spain?

The different authors belong to a variety of university and research institutions located throughout Spain. In total there are

FIGURE 2
Flow diagram. Source: own production.

30 entities spread over 12 autonomous communities and cities. There are also articles with affiliations from foreign universities in Chile (Universidad La Frontera), Colombia (Universidad Central de Bogotá) and Canada (University of Toronto).

Among the affiliations, in addition to university affiliations, other private and public institutions are visible. For example, private institutions include the Fundación de Estudios de Economía Aplicada (FEDEA) in Madrid and "La Caixa" Research in Barcelona. Among the public institutions other than universities, the Instituto de Evaluación del Ministerio de Educación in Madrid and the Colegio de Educación Infantil y de Primaria (CEIP) in Melilla stand out.

Of the 30 affiliations, eight were from universities in Andalusia, representing 26.66%. The universities of Seville and Malaga have two affiliations each. They are followed by the

Universidad Pablo de Olavide, the Universidad de Jaén, the Universidad Loyola de Andalucía, and the Universidad de Huelva with one affiliation.

Catalonia is in second place with six affiliations (20%). These are distributed between the University of Barcelona with 2, and "La Caixa" Research, Universitat Pompeu Fabra, Universitat Internacional de Catalunya, and Universidad Autónoma Barcelona with one affiliation each.

They are followed by the communities of Madrid and the Balearic Islands with five each. In the Madrid region, there are two studies by the Universidad Nacional de Educación a Distancia, and three studies distributed between the Fundación de Estudios de Economía Aplicada (FEDEA), the Instituto Evaluación del Ministerio de Educación, and the Universidad de Comillas. Interestingly, the University of the Balearic Islands
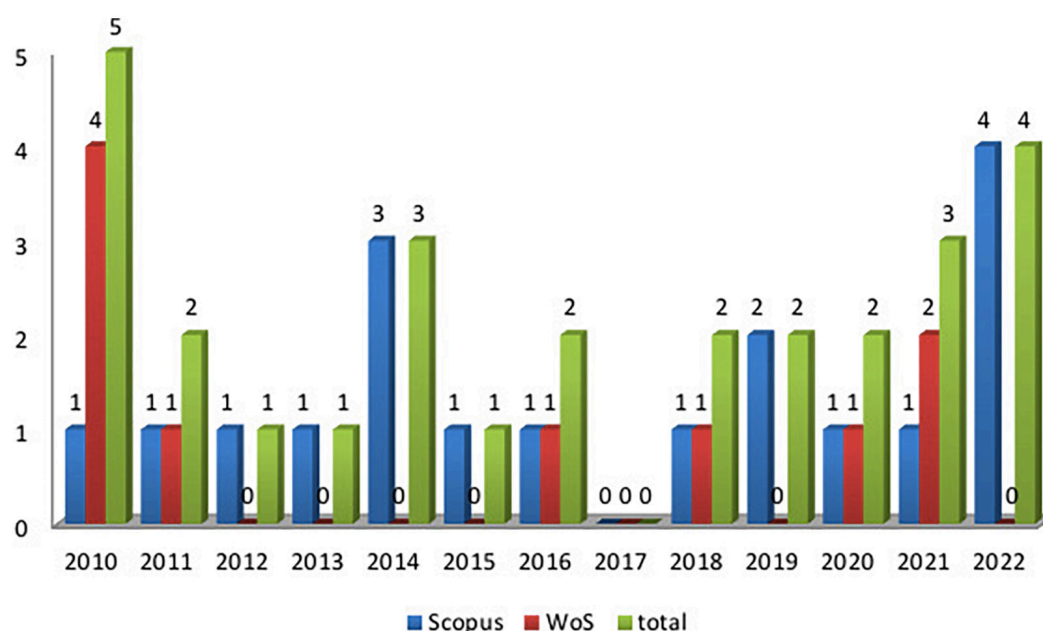
FIGURE 3
Articles published in Scopus and WoS databases since 2010 on early school leavers in Spain.

leads the number of publications compared to the other institutions with five published works.

With three studies we find the Community of Castilla y León, with affiliations from the universities of Salamanca, León, and Valladolid. With two works are the communities of Murcia (University of Murcia), Principality of Asturias (University of Oviedo), and the Autonomous City of Melilla (University of Granada Campus Melilla and College of Infant and Primary Education).

Finally, with one published work, the universities of Zaragoza, Valencia, La Rioja, and Vigo are identified.

3.4 How many studies have focused on the reasons for the high drop-out rates in Spain? What are the main factors that lead to high drop-out rates?

Twenty-four articles were found out of a total of 28 which address the causes of early school leaving in Spain. Many of them work on the causes and proposals for prevention in a concatenated manner, which is why the same work points to several reasons for dropping out of school. The reasons listed in these studies are: personal, family, educational, social and educational policy reasons.

Social and educational causes are the most frequent with 13 papers each. They are followed by personal (8), family (8) and educational policy (5) reasons. The reasons can be summarized as follows:

- Educational: type of learning offered in educational institutions adapted to the context of the students, absenteeism, school conflicts, poor educational support, low academic performance, grade repetition, deficiencies in teacher training, difficulties in critical subjects such as mathematics or language, low reading comprehension, low participation of the educational community, class size, and student/teacher ratio (Cobo, 2010; Mora et al., 2010; Rico-Martín and Mohamedi-Amaruch, 2014; Salvà-Mut et al., 2014; González-Losada et al., 2015; Fernández-Suárez et al., 2016; Guio et al., 2018; Prados and Rodríguez, 2018; Gil et al., 2019; Lázaro et al., 2020; López et al., 2021; Morentin-Encina, 2021).

- Social: ease of access to the low-skilled labor market such as in the construction and service sectors, neighborhood environments, peer group or friends, frustration with dissonance between degree and success, socially vulnerable environments, labor market conditions, social and economic disadvantages and lack of reciprocity in friendship relationships (Castro, 2010; Cobo, 2010; Tomas and Gómez, 2010; Amer, 2011; Mora and Oreopoulos, 2011; Tomás et al., 2012; Mínguez, 2013; Salvà-Mut et al., 2014; Guio et al., 2018; Prados and Rodríguez, 2018; Lázaro et al., 2020; López et al., 2021; Cerdà-Navarro et al., 2022).

- Personal: lack of student commitment, defiant attitude, irresponsibility, alcohol and drug abuse, learning difficulties, health problems, poor results, wanting to do other courses, lack of social and emotional competences, aversion to study, low involvement and

inadequate behavior in the classroom (Cobo, 2010; González-Losada et al., 2015; Fernández-Suárez et al., 2016; Prados and Rodríguez, 2018; Aguilar et al., 2019; Gil et al., 2019; Rueda et al., 2020; Cerdà-Navarro et al., 2022). Familiares: cabeza de familia ausente, entorno socioeconómico, la nacionalidad y la situación laboral de los padres, el compromiso de la familia con la educación de sus hijos y los antecedentes familiares (Cobo, 2010; Tomas and Gómez, 2010; Tomás et al., 2012; Mínguez, 2013; Salvà-Mut et al., 2014; Fernández-Suárez et al., 2016; Prados and Rodríguez, 2018; Gil et al., 2019).

- Political: the way of calculating school dropout (including people involved in non-formal educational activities increases the indicators and decreases if the newly arrived foreign population is excluded); deficient education policies as Spain has the highest dropout rate in Europe, the change in the LOGSE education law by reducing flexibility, the levels of spending on education and the greater problems of the Mediterranean regions compared to those in the north of Spain (Macías et al., 2010; Mora et al., 2010; Felgueroso et al., 2014; Martínez et al., 2016; Guio et al., 2018).

3.5 How many studies are specifically aimed at preventing and solving this problem? What do they propose to do to reduce school dropout?

Out of the 28 studies selected, 12 have different proposals for the prevention of early school leaving. In each of them, several proposals of different natures have generally been found. The most recurrent, with seven articles, are those aimed at improving education policy in different aspects: transcending regional and party politics, proposing more inclusive prevention plans, plans aimed at different groups, policies that require the recruitment of qualified staff and greater investment in education (Cobo, 2010; Amer, 2011; Mínguez, 2013; Martínez et al., 2016; Aguilar et al., 2019; Rodríguez-Izquierdo, 2022; Sánchez-Lissen, 2022).

The next prevention measure is related to greater participation of the educational community with five studies (Cobo, 2010; Amer, 2011; Aguilar et al., 2019; Rueda et al., 2020; Fernández-Menor and Latas, 2021). In this sense, the aim is to work on it from the Primary Education stages, where there is a demand to foster a greater sense of belonging to the community from families, students and local communities. This is followed by the early identification of low academic performance and its improvement, which is addressed in four of the selected articles (Aguilar et al., 2019; Lázaro et al., 2020; Sánchez-Lissen, 2022; Usán-Supervía et al., 2022).

Other proposals present in the remaining studies call for: improving teacher training in intercultural education, intervention strategies, and emotional coaching (Aguilar et al., 2019; Gil et al., 2019; Usán-Supervía et al., 2022), promoting curricular diversification and increasing the educational offer, favoring curricular flexibility (Cobo, 2010; Martínez et al., 2016) and promoting vocational training (Cobo, 2010; Rueda et al., 2020).

4 Discussion and conclusion

This systematic review has been carried out following quality standards (Ramírez et al., 2018). This makes the process of reviewing and extracting the literature rigorous. Within this framework, the work carried out provides an interesting overview of the highly relevant issue of school dropout in Spain today, given that one of the objectives of educational institutions is to provide quality education.

The ultimate objective of educational institutions is to provide equal opportunities for the integral development of students, which means that as few students as possible should drop out of the education system, as the opposite would imply failure not only for the student, but also for the education system. In Spain, as mentioned above, the drop-out rates are above the European Union average, and remain far from the European targets set for this year.

Despite being a problem that is present in the Spanish education system, and in reference to the first objective set out, the research work that has been carried out in this respect is considerably insufficient. Although, analysing the graphs obtained, since 2010 there have not been so many studies published until 2022, with a total of just four articles. In line with the above, if we group the articles found by field of knowledge, the data show that, within the field of Social Sciences is where most papers are found with a total of 14 documents, followed by Education Educational Research with seven papers.

The various authors who have carried out research on early school leaving in Spain belong to some 30 affiliations. However, in first place are the eight universities in Andalusia, followed by Catalonia. Andalusia may have a higher number of research studies in this field due to the fact that it is a problem that arises in the autonomous community as it has the highest number of cases of early school leavers in the whole peninsula, with 21.8% according to data from the National Institute of Statistics (Instituto Nacional de Estadística [INE], 2020).

In relation to the many factors and origins that influence school dropout, both educational and social causes are the ones that have the greatest impact on this fact. Analysing the selected articles and as mentioned by Romero and Hernández (2019), absenteeism may be due to the social environment and the type of teaching offered at school, which is sometimes poorly adapted to the context of the students. On the other

hand, there are personal factors such as low motivation on the part of the students, causing a lack of commitment and ending with educational dropout (Hernández and Alcaraz, 2018; Rueda et al., 2020).

Within the framework of the above, the most relevant and forward-looking approach is to propose inclusive prevention plans aimed at different groups, as well as policies that invest in education and hire qualified staff. Teachers should be continuously monitored to find out what methodologies they use, whether they adapt effectively to the context in which they work, how they treat their colleagues and students, and whether they provide adequate ongoing training, among other things. To promote learning and avoid school dropout, educational programmes and scholarship schemes can be used to stimulate learning for students with limited resources.

By way of conclusion, the work carried out has shown that dropping out of school is one of the most serious and worrying problems in the Spanish education system. However, in spite of this, there is not enough research into the causes of early school leaving, and there are not enough prevention plans to avoid early school leaving in Spanish institutions.

Data availability statement

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

Author contributions

NM-P was responsible for the introduction and literature review. MR-N-P and FL-L for the methodology and results. BB-O for the discussion and conclusions and translation. All team members have been involved in the planning and development of the publication, reading drafts, and suggesting changes. The work has been developed as a team in order to maintain a common thread. All authors contributed to each section of the article and approved the submitted version.

Conflict of interest

Publisher's note

References

Aguilar, P., Lopez-Cobo, I., Cuadrado, F., and Benítez, I. (2019). Social and emotional competences in Spain: A comparative evaluation between Spanish needs and an international framework based on the experiences of researchers, teachers, and policymakers. *Front. Psychol.* 10:2127. doi: 10.3389/fpsyg.2019.02127

Amer, J. (2011). Education and tourist society in Balearic Islands: The public education policies to the impact of the economy of tourism services in the dropout. *Investig. Turístic.* 2, 66–81.

Castro, R. (2010). The effects of credentialism and social expectations on dropping out of school. *Rev. Educ.* 147–169.

Cerdà-Navarro, A., Quintana-Murci, E., and Salvà-Mut, F. (2022). Reasons for dropping out of intermediate vocational education and training in Spain: The influence of sociodemographic characteristics and academic background. *J. Vocat. Educ. Train.* 1–25. doi: 10.1080/13636820.2022.2049625

Cobo, E. (2010). Early leavers in education and training in Spain. *Rev. Educ.* 31–62.

Eurostat (2022). *Early leavers from education and training by sex and NUTS 1 regions.* Available online at: https://ec.europa.eu/eurostat/databrowser/view/tgs00106/default/map?lang=en (accessed October 15, 2022).

Eurydice (2014). *La lucha contra el abandono temprano de la educación y la formación en Europa: Estrategias, políticas y medidas.* Luxembourg: Publications Office of the European Union.

Felgueroso, F., Gutiérrez-Domènech, M., and Jiménez-Martín, S. (2014). Dropout trends and educational reforms: The role of the LOGSE in Spain. *IZA J. Lab. Policy* 3, 1–24. doi: 10.1186/2193-9004-3-9

Fernández-Menor, I., and Latas, Á (2021). Notes on the fight against exclusion from the socio-educational community. *Rev. Prism. Soc.* 33, 183–201.

Fernández-Suárez, A., Herrero, J., Pérez, B., Juarros-Basterretxea, J., and Rodríguez-Díaz, F. (2016). Risk factors for school dropout in a simple of juvenile offenders. *Front. Psychol.* 7:1993. doi: 10.3389/fpsyg.2016.01993

García, B. (2016). Indicators of early school desertion: A framework for reflection on strategies for improvement. *Perf. Educ.* 38, 191–213.

Gil, A., Antelm-Lanzat, A., Cacheiro-González, M., and Pérez-Navío, E. (2019). School dropout factors: A teacher and school manager perspective. *Educ. Stud.* 45, 756–770. doi: 10.1080/03055698.2018.1516632

González-Losada, S., García- Rodríguez, M., Ruíz- Muñoz, F., and Muñoz-Pichardo, J. (2015). Risk factors of early high school dropout: Andalusia middle school teachers' perspective. *Profesorado* 19:4.

González-Rodríguez, D., Vieira, M. J., and Vidal, J. (2019). The perception of primary and secondary school teachers about the variables that influence early school leaving. *Rev. Inv. Educ.* 37, 181–200. doi: 10.6018/rie.37.1.343751

Guio, J., Choi, Á, and Escardíbul, J. (2018). Labor markets, academic performance and school dropout risk: Evidence for Spain. *Int. J. Manpow.* 39, 301–318. doi: 10.1108/IJM-08-2016-0158

Hernández, M. A., and Alcaraz, M. (2018). Factores incidentes en el abandono escolar prematuro. *Rev. Investig. Educ.* 16, 182–195.

Instituto Nacional de Estadística [INE] (2020). *Abandono educativo temprano de la población de 18 a 24 años por CCAA y periodo.* Available online at: https://www.ine.es/jaxi/Datos.htm?path=/t00/ICV/dim4/l0/&file=41401.px#!tabs-grafico (accessed October 10, 2022).

Lázaro, S., Urosa, B., Mota, R., and Rubio, E. (2020). Primary education truancy and school performance in social exclusion settings: The case of students in Cañada real Galiana. *Sustainability* 12:8464. doi: 10.3390/su12208464

Llorent-Bedmar, V., and Cobano-Delgado, V. (2018). Spanish educational legislation reforms during the current democratic period: A critical perspective. *Arch. Analíticos Polít. Educ.* 26, 1–23. doi: 10.14507/epaa.26.2855

López, M., Bernad, I., García, J., Córdoba- Iñesta, A., Urraco, E., Méri, E., et al. (2021). Student engagement in vocational education and training: Differential analysis in the province of Valencia. *Rev. Educ.* 394, 181–204. doi: 10.4438/1988-592X-RE-2021-394-505

Macías, E., Llorente, R., Pino, F., and Perez, J. (2010). Some arithmetic remarks on school failure and early school dropout in Spain. *Rev. Educ.* 307–324.

Martínez, M., Reverte, G., and Manzano, M. (2016). School failure in Spain and its regions: Territorial disparities and proposals for improvement. *Rev. Estud. Reg.* 121–155.

MECP (2004). *Sistema estatal de indicadores de la educación. Proyecto 2004.* Madrid: Ministerio de Educación Cultura y Deporte. doi: 10.4438/176-04-123-6

MEFP (2021). *Sistema estatal de indicadores de la educación.* Madrid: Ministerio de Educación y Formación Profesional.

Mínguez, A. (2013). The early school leaving in Europe: Approaching the explanatory factors. *N. Horiz. Educ.* 61:50.

Moher, D., Liberati, A., Tetzlaff, J., and Altman, D. G. (2009). Elementos de informe preferidos para revisiones sistemáticas y metanálisis: La declaración de PRISMA. *Ann. Intern. Med.* 151, 264–269. doi: 10.1371/journal.pmed.1000097

Mora, T., and Oreopoulos, P. (2011). Peer effects on high school aspirations: Evidence from a sample of close and not-so-close friends. *Econ. Educ. Rev.* 30, 575–581. doi: 10.1016/j.econedurev.2011.01.004

Mora, T., Escardíbul, J., and Espasa, M. (2010). The effects of regional educational policies on school failure in Spain. *Rev. Econ. Aplic.* 18, 79–106.

Morentin-Encina, J. (2021). Lost studies, found learning. Analysis of learning from early school leaving. *REICE Rev. Iberoam. Cal. Efic. Camb. Educ.* 19, 103–120. doi: 10.15366/reice2021.19.3.007

Prados, M., and Rodríguez, M. (2018). Determining factors of early school leaving. *Rev. Investig. Educ.* 16, 182–195.

Ramírez, G. M., Collazos, C. A., Moreira, F., and Fardoun, H. (2018). Relationship between U-learning, connective learning and the xAPI standard: Systematic review. *Campus Virtuales* 7, 51–62.

Ramos-Navas-Parejo, M., Cáceres-Reche, M. P., Soler-Costa, R., and Marín-Marín, J. A. (2020). El uso de las TIC para la animación a la lectura en contextos vulnerables: Una revisión sistemática en la última década. *Texto Tivre Ling. Tecnol.* 13, 240–261. doi: 10.35699/1983-3652.2020.25730

Rico-Martín, A., and Mohamedi-Amaruch, A. (2014). Evaluación de la comprensión lectora en alumnos bilingües mazigio-español al término de la educación primaria. *Calidoscópio* 12, 49–63. doi: 10.4013/cld.2014.121.06

Rizo, L. J., and Hernández, C. (2019). El fracaso y el abandono escolar prematuro: El gran reto del sistema educativo español. *Papeles Salmantinos Educ.* 23, 55–81.

Rodríguez-Izquierdo, R. (2022). Identifying factors and inspiring practices for preventing early school leaving in diverse Spain: Teachers' perspectives. *Intercult. Educ.* 33, 123–138. doi: 10.1080/14675986.2021.2018191

Romero, E., and Hernández, M. (2019). Analysis of endogenous and exogenous causes of early school dropout: A qualitative research. *Education XX1*, 22, 263–293. doi: 10.5944/educxx1.21351

Romero-Rodríguez, J. M., Ramírez-Montoya, M. S., Aznar-Díaz, I., and Hinojo-Lucena, F. J. (2020). Social appropriation of knowledge as a key factor for local development and open innovation: A systematic review. *J. Open Innov. Technol. Mark. Complex.* 6:44. doi: 10.3390/joitmc6020044

Rueda, P., Torello, O., and Mut, F. (2020). Educational disengagement profiles: A multidimensional contribution within basic vocational education and training. *Rev. Educ.* 389, 67–91. doi: 10.4438/1988-592X-RE-2020-389-455

Salvà-Mut, F., Oliver-Trobat, M., and Comas-Forgas, R. (2014). Assessment of reading comprehension of Berber-Spanish bilingual students at the end of primary education. *Magis Rev. Int. Investig. Educ.* 6, 129–142. doi: 10.11144/Javeriana.M6-13.AEDE

Sánchez-Lissen, E. (2022). Reasons for an educational pact in Spain within the framework of decentralised government administration. *Rev. Span. Pedag.* 80, 311–330.

Tiana-Ferrer, A. (2018). Thirty years of school evaluation in Spain. *Education XX1*, 21, 17–36. doi: 10.5944/educxx1.21419

Tomas, A., and Gómez, M. (2010). Determinants of early drop-outs in Spain: A analysis by gender. *Rev. Educ.* 191–223.

Tomás, A., Solís, J., and Torres, A. (2012). School dropout by gender in the European Union: Evidence from Spain. *Estud. Sobre Educ.* 23, 117–139. doi: 10. 15581/004.23.2052

Usán-Supervía, P., Salavera-Bordás, C., and Quílez-Robres, A. (2022). Self-efficacy, optimism, and academic performance as psychoeducational variables: Mediation approach in students. *Children* 9:420. doi: 10.3390/children90 30420

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

Mercedes Cuevas-López[1]*, Francisco Díaz-Rosas[1], María Teresa Díaz-Mohedo[2] and Manuel Ricardo Vicente-Bújez[2]

[1]Department of Didactics and School Organization, University of Granada, Granada, Spain, [2]Department of Didactics of Musical, Plastic and Body Expression, University of Granada, Granada, Spain

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-probability 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

Author contributions

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

Funding

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.

Publisher's note

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

References

Álvarez Ferrándiz, D., Arias Corona, M., González Castellón, E., and Fernández Cruz, M. (2022). Neurodidactic factors in the prediction of academic dropout in Andalusian university students: preventive actions based on ICT. *Texto Livre* 15:e40502. doi: 10.35699/1983-3652.2022.40502

Bernardo, A., Cerezo, R., Rodríguez-Muñiz, L. J., Núñez, J. C., Tuero, E., and Esteban, M. (2015). Predicción del abandono universitario: variables explicativas y medidas de prevención. *Fuentes* 16, 63–84. doi: 10.12795/revistafuentes.2015.i16.03

Casanova, J. R., Cervero, A., Núñez, J. C., Almeida, L. S., and Bernardo, A. (2018). Factors that determine the persistence and dropout of university students. *Psicothema* 30, 408–414. doi: 10.7334/psicothema2018.155

Feixas, M., Muñoz, J. L., Gairín, J., Rodríguez-Gómez, D., and Navarro, M. (2015). Hacia la comprensión del abandono universitario en Catalunya: el caso de la Universitat Autònoma de Barcelona. *Estudios sobre Educación* 28, 117–138. doi: 10.15581/004.28.117-138

Fernández Cruz, M., Álvarez Rodríguez, J., Ávalos Ruiz, I., Cuevas López, M., de Barros Camargo, C., Díaz Rosas, F., et al. (2020). Evaluation of the Emotional and Cognitive Regulation of Young People in a Lockdown Situation Due to the Covid-19 Pandemic. *Front. Psychol.* 11:565503. doi: 10.3389/fpsyg.2020.565503

Fernández-Cruz, M., and Gijón, J. (2012). Formación de profesionales basada en competencias. *Journal Educ. Teachers Train.* 3, 109–119.

Fernández-Mellizo, M. (2022). *Análisis del abandono de los estudiantes de grado en las universidades presenciales en España*. Madrid: Ministerio de Universidades.

Fernández-Mellizo, M., and Constante-Amores, A. (2020). El rendimiento académico de los estudiantes de nuevo ingreso de la Universidad Complutense de Madrid. *Revista de Educación* 387, 213–223. doi: 10.4438/1988-592X-RE-2020-387-433

González-Campos, J. A., Carvajal-Muquillaza, C. M., and Aspeé-Chacón, J. E. (2020). Modelación de la deserción universitaria mediante cadenas de Markov. *Uniciencia* 34, 129–146. doi: 10.15359/ru.34-1.8

González-Ramírez, T., and Pedraza-Navarro, I. (2017). Variables sociofamiliares asociadas al abandono de los estudios universitarios. *Educatio Siglo XXI* 35, 365–388. doi: 10.6018/j/298651

Hernández-Armenteros, J., and Pérez-García, J. A. [Dirs.] (2019). *La universidad española en cifras 2017–18*. Madrid: CRUE Universidades Españolas. Recuperado de: UEC-1718_FINAL_DIGITAL.pdf

Lightsey, O. R., and Boyraz, G. (2011). Do positive thinking and meaning mediate the positive affect-life satisfaction relationship? *Can. J. Behav. Sci.* 43, 203–213. doi: 10.1037/a0023150

Lizarte, E. J. (2017). *Análisis de los estudios en la Universidad de Granada: El caso de la Facultad de Ciencias de la Educación*. Granada: Universidad de Granada. http://hdl.handle.net/10481/62301

Ministerio de Educación y Formación Profesional (2020). "Panorama de la educación," in *Indicadores de la OCDE 2020* (Madrid: Secretaría de Estado de Educación).

Munizaga, F., Cifuentes, M., and Beltrán, A. (2018). Retención y abandono estudiantil en la Educación Superior Universitaria en América Latina y el Caribe: Una revisión sistemática. *Archivos Analíticos de Políticas Educativas* 26, 1–36. doi: 10.14507/epaa.26.3348

Pellagatti, M., Masci, C., Ieva, F., and Paganoni, A. M. (2021). Generalized mixed-effects random forest: a flexible approach to predict university student dropout. *Stat. Anal. Data Min.* 14, 241–257. doi: 10.1002/sam.11505

Rodríguez-Muñiz, L. J., Bernardo, A., Esteban, M., and Díaz, I. (2019). Dropout and transfer paths: what are the risky profiles when analyzing university persistence with machine learning techniques? *PLoS One* 14:e0218796. doi: 10.1371/journal.pone.0218796

Subdirección General de Actividad Universitaria Investigadora de la Secretaría General de Universidades (2022). *Datos y cifras del Sistema Universitario Español. Publicación 2021–2022*. Madrid: Ministerio de Universidades.

Tinto, V. (1975). Dropout from higher education: a theoretical synthesis of recent research. *Rev. Educ. Res.* 45, 89–125. doi: 10.3102/00346543045001089

Tinto, V. (2012). *Completing college: Rethinking Institutional Action*. Chicago: University of Chicago Press. doi:10.7208/chicago/9780226804545.001.0001

Triadó, X. M., Aparicio, P., Freixa, M., and Torrado, M. (2015). Satisfacción y motivación del profesorado en el primer curso en grados de ciencias sociales. *REDU. Revista de Docencia Universitaria* 13, 203–229. doi: 10.4995/redu.2015.6454

Tuero, E., Cervero, A., Esteban, M., and Bernardo, A. (2018). ¿Por qué abandonan los alumnos universitarios? Variables de influencia en el planteamiento y consolidación del abandono. *Educación XX1* 21, 131–154. doi: 10.5944/educxx1.20066

Urbina, J. E., and Ovalle, G. A. (2016). Abandono y Permanencia en la Educación Superior: Una aplicación de la Teoría Fundamentada. *Sophia* 12, 27–37. doi: 10.18634/sophiaj.12v.1i.290

Velázquez, Y., and González, M. A. (2017). Factores asociados a la permanencia de estudiantes universitarios: caso UAMM-UAT. *RESU Revista de la Educación Superior* 46, 117–138. doi: 10.1016/j.resu.2017.11.003

Incident factors in Andalusian university dropout: A qualitative approach from the perspective of higher education students

María Jesús Santos-Villalba[1]*,
María José Alcalá del Olmo Fernández[2],
Marta Montenegro Rueda[3] and José Fernández Cerero[3]

[1]Department of Didactics and School Organization, University of Granada, Granada, Spain,
[2]Department of Didactics and School Organization, University of Málaga, Málaga, Spain,
[3]Department of Teaching and Educational Organization, University of Seville, Seville, Spain

University dropout is currently one of the main challenges faced by government bodies and state and regional universities. Both personal and institutional reasons can be identified as root causes of university dropout. On a personal level, students accumulate experiences of academic failure that lead them to reflect on the possibility of continuing their studies, while from an institutional point of view, failure can be attributed to educational deficits, reputation, and quality parameters of the university institution itself. Even though more and more universities have educational policies aimed at reducing dropout rates, the dropout figures continue to rise, which shows that this is a complex problem due to the number of variables involved. The main objective of this study is to analyze the factors that influence university dropout among Andalusian students. The methodology is qualitative through a focus group with the participation of 12 students who dropped out of their academic studies in education science degrees at the University of Malaga (Spain). The study population corresponds to students who formalized their enrollment in the first year of the degree in the 2021/22 academic year. The content analysis followed a deductive category development model. The results reveal that the factors that explain the educational abandonment of the students, who are the object of this research, are identification with studies that did not meet their initial expectations, the use of traditionalist methodologies, the development of work activity, and the economic difficulties in covering the costs derived from university education. The main conclusion include the importance of designing educational policies in line with the reality and needs of the students, the use of innovative methodologies that increase the degree of motivation of the students, as well as studying dropouts from a holistic perspective, considering the multiple variables that influence its origin.

KEYWORDS

university dropout, higher education, university persistence, dropout prevention, factors

1. Introduction

Dropping out of university studies is currently one of the main concerns that attract the attention of educational institutions in different countries due to the negative consequences it generates, not only because of the loss of resources but also because of the limitations for social, economic, and cultural development (González and Uribe, 2018). The statistics on university dropout rates are overwhelming and are the best representation of the magnitude of this problem (Urbina and Ovalles, 2016).

Specifically, in Spain, the Labour Force Survey (LFS) reveals that the rate of early school leavers stands at 16% (Instituto Nacional de Estadística (INE), 2020). This percentage is far from the target set by the European Union in the Europe 2020 Strategy, which stipulated reducing the dropout rate in Spain to a maximum of 15% (European Commission, 2020). All this generates economic losses of more than 1 billion euros per year in Spain (Colá, 2015). As a result, reducing university dropout remains one of the fundamental objectives of government agendas and a challenge for education professionals in the 21st century (Tuero-Herrero et al., 2020).

Therefore, in the scientific field, university dropout and retention are of great concern to the educational community and researchers. In the national context, various research works were carried out to identify the factors involved in university dropout using a quantitative methodology. The research carried out by López-Cózar-Navarro et al. (2020) focused on analyzing the personal and educational variables that lead to university dropout. The conclusion of this study include the importance of educational guidance in the compulsory stage and its continuity in higher education. Along the same lines as the earlier research, Cervero et al. (2021) identified that certain factors of academic, social, and affective origin, such as, for example, low self-esteem and motivation, are among some of the causes of university dropout.

In the international context, several studies have also been carried out in the field of research. One of them, carried out in South Korea, aimed to study the factors affecting university dropout through the analysis of interviews. The findings show that family influence had a negative impact on students' university satisfaction along with academic success, and these two factors are considered to be highly significant in reducing university dropout (Jae Kyung, 2022). The research carried out by Velasco Poveda et al. (2020) concluded that economic and family factors have a significant impact on university dropout. In the same way, they highlighted other influential factors such as motivation, academic success, and the emotional state of the students. Research on university students in Germany finds that the decision to drop out is centered on emotional, motivational, behavioral, and cognitive-affective variables (Bäulke et al., 2022), the interest and expectations of study (Behr et al., 2021), or with different personal and environmental barriers or conditions

that prevent the successful pursuit of a career (Powazny and Kauffeld, 2021).

These and other research studies (González González, 2006; Bethencourt Benítez et al., 2008; Arce et al., 2015; Constante-Amores et al., 2021) focus on identifying some of the factors that may influence university dropout, although they do not delve into the students' own perceptions during their educational career, which would allow a more detailed understanding of the causes that led to this phenomenon. However, it is worth mentioning Tinto (1975), a reference in the study of the phenomenon of university dropout, whose interactionist model highlights the importance of different variables in explaining university dropout: the importance of the student's previous academic history, in terms of study skills and academic performance; the socio-economic conditions of the family; expectations with the studies chosen in higher education; the sense of relevance with the peer group; and the involvement in university academic life through participation in curricular and extracurricular activities (Tinto, 1993; Tinto and Russo, 1994).

This would be the central focus of this study, together with the need to develop preventive measures to guarantee continuance at university, given that the research carried out has focused more on analyzing the variables involved in university dropout, but not so much on how to prevent university dropout and encourage continuance.

2. University dropout in the autonomous community of Andalusia

The concept of university dropout is characterized by its complexity (Stiller and Bachmaier, 2017), so, we can find several factors that are associated with this phenomenon. University dropout admits various definitions; on the one hand, as a process in which students disengage, temporarily or permanently, from the institution or the educational system after having enrolled in the corresponding studies (Páramo and Correa, 1999). On the other hand, as a difference between students who enter a degree program for the first time and those who graduate having passed all the corresponding subjects (Zandomeni et al., 2016).

In this study, we have considered university dropout as the phenomenon that defines students who have canceled their enrollment during the first year or who have not enrolled in the same university the following year (Tuero-Herrero et al., 2020; Portal Martínez et al., 2022). This interruption can be motivated by various reasons: involuntary dropout, starting other studies, entering the world of work, the desire to resume studies in the future, poor academic performance, and/or low identification with the chosen studies (Esteban et al., 2017; Casanova et al., 2018b; Casanova et al., 2022). The situations identified are diverse and the lack of terminological clarification can lead to confusion; however, for university institutions, any situation

that leads students to interrupt their studies should be valued as a failure, as they have not managed to successfully complete the educational objectives of the program taught, apart from the loss of time, cost, and the psychological trauma of the individual who drops out (Cabrera et al., 2006a; Faas et al., 2018; Sosu and Pheunpha, 2019).

Therefore, it is necessary to identify and analyze the factors that could be at the origin of this phenomenon. Currently, personal, academic, sociological, sociological, economic, and organizational factors are some of the most studied (Viale, 2014; Constante-Amores et al., 2021). The first is closely related to variables such as students' gender or age. An example of this is associated with a study conducted at the University of Seville, where they concluded that women were significantly more likely than men to drop out of university studies (González-Ramírez and Pedraza-Navarro, 2017). Likewise, the age at the start of studies also influences the probability of dropping out; in fact, most students who drop out start their studies when they are over 20 years old (Aranque et al., 2009).

Among the personal variables, we can also find the motives and the order of degree choice (Tuero-Herrero et al., 2020). In this line, vocational issues are closely related to motivation, as well as to permanence in studies (Cabrera et al., 2006b). On the other hand, academic variables are linked to satisfaction and fulfillment of the expectations of the chosen degree, as well as class attendance and involvement in educational development (Esteban et al., 2017; Casanova et al., 2018a).

In relation to socio-economic factors, the importance of support networks, closeness in the relationship with the teaching staff, relations with the family, the enjoyment of grants, or the level of studies of their parents can be highlighted as key aspects that favor permanence at the university (Gilardi and Guglielmetti, 2011; Esteban et al., 2016). In this sense, student retention is better when the family environment has sufficient economic resources to cover the costs of their children's studies (Casanova et al., 2018a). Finally, another research study has shown that satisfaction with the activity and skills of teachers, as well as the organization of university studies, plays an important role in academic decision-making (Duque et al., 2013). All these situations can lead to both dissatisfaction and demotivation of students, which can lead to university dropout.

To carry out this study, various research and reports, both national and regional, have been considered as a starting point. In relation to national studies, it should be noted that university dropout is one of the major problems of the Spanish university system (Esteban et al., 2017). Hence, in Spain, statistics are published every year on dropout rates in Spanish universities. It is estimated that every year approximately 125,000 students who enroll at a Spanish university end up dropping out of the academic year (Pérez and Aldás, 2022), causing large economic losses for the Spanish government (Portal Martínez et al., 2022). The annual report "Facts and figures of the Spanish university system" of the Spanish Ministry of Education corroborates these

data, placing Spain as one of the countries with the worst university success rates, causing several negative consequences (Ministerio de Educación Cultura y Deporte (MECD), 2015; Pérez and Aldás, 2022). First, students who decide to drop out of their studies face a loss of resources invested in their education, such as time or money (Mestan, 2016). On the other hand, for the university institution, dropping out has a negative impact on its prestige, as well as large financial losses (González-Ramírez and Pedraza-Navarro, 2017).

These aspects are not only reflected in statistics but also constitute a topic of great interest in the scientific community. Accordingly, several studies (Bethencourt Benítez et al., 2008; Constante-Amores et al., 2021) that highlight the factors that influence university dropout among Spanish students are of different natures (demographic, socioeconomic, and academic). Along the same lines, Castaño et al. (2008) analyzed the factors associated with student dropout based on qualitative studies, also associating psychological and institutional factors with university dropout.

If we focus on the Andalusian context, this autonomous community is the one most affected by this phenomenon. According to the report "The Spanish University in Figures" by the Conference of Rectors of Spanish, Andalusia is one of the regions with the highest dropout rate, being only surpassed by the Autonomous Community of the Canary Islands, the Balearic Islands, and the Principality of Asturias (Conferencia de Rectores de Universidades Españolas (CRUE), 2017). The reports carried out in this context can serve as a guide to determine the relevant factors of academic dropout, concluding that different socioeconomic and family variables have a special impact on university dropout among Andalusian students, such as living outside the family home, depending on a scholarship, or combining studies with work (Conferencia de Rectores de Universidades Españolas (CRUE), 2017; González-Ramírez and Pedraza-Navarro, 2017).

In view of this reality in Andalusia, this study aims to analyze the factors that intervene both in university dropout and staying at the university, based on the experiences of students at the University of Malaga. The following specific objectives are derived from this general objective: to identify how the choice of a university degree and its course influences possible university dropout; to investigate the personal, family, and/or economic causes that led to university dropout; to find out about the different post-dropout trajectories from a personal, academic, and/or employment perspective of the students; and to propose good pedagogical practices that contribute to university permanence.

3. Materials and methods

The methodology of this research was qualitative, based on the focus group technique, with the aim of analyzing the

factors that influence university dropout in students belonging to the Faculty of Education Sciences at the University of Malaga (Spain). A focus group was carried out with a total of 12 students, of which nine were female students and three were male students. These were students who dropped out of their academic studies in the area of Educational Sciences and who formalized their enrollment in the first year of their degree in the 2021/22 academic year. The participants were from degree programs in Social Education, Early Childhood Education, Primary Education, and Pedagogy. Table 1 shows the distribution of students based on the degree program.

During the course of the focus group, the participants were encouraged to express their opinions freely, with the participation of a moderator who was responsible for directing and redirecting the debate toward the issues addressed in this study.

To gain access to the participants, we considered the information collected on the virtual campuses of some of the subjects of the aforementioned degrees, where we identified cases of students whose enrollment had been discontinued. A letter was drafted and sent *via* e-mail, considering their possible interest in participating in this research. The letter explained the main objectives of the research, the reason for conducting the focus group, and the possibility of adapting to the personal needs of the students who were to participate. Throughout the whole process of data collection, different ethical codes were established to ensure the confidentiality and wellbeing of the people involved. The data collection took place in the last term of the 2021/22 academic year, starting in July and ending in September.

The focus group lasted approximately 1–1.5 h. The session was conducted virtually, and prior authorization was requested to proceed with the recording.

Considering the complexity associated with the phenomenon of university dropout and the multiple factors associated with it, it was considered appropriate to adapt this study to Torrado's (2012) telephone interview, which made it possible to inquire about issues related to the current situation of each student, the causes that led to their dropping out, as well

as their academic and employment trajectory after dropping out.

The questions addressed in the focus group were the following:

- What studies gave you access to a university degree?
- Which degree did you choose to start your university education?
- What were the reasons that led you to choose that degree?
- Did you attend classes regularly?
- How did you approach the study of different subjects while you were a university student?
- How did you deal with any questions or doubts that arose during your studies?
- In general, how do you evaluate your university experience?
- For what family, personal, and/or financial reasons did you drop out of university?
- Since leaving university, have you considered continuing your studies? Or have you chosen to work?
- What do you do now?
- What suggestions would you give to colleagues who want to start university studies?
- What suggestions would you give to those in charge of universities so that students do not become demotivated and attend classes regularly?

In the process of analyzing the information, the following phases were followed: recording, literal transcription of the recordings, pre-reading of the transcriptions, definition and coding of the deductive categories and subcategories, design of the hermeneutic unit, inductive obtaining of the fragments (quotes), elaboration of the semantic network of the macrocategory, and the semantic network of categories with empirical evidence. For all this, the qualitative analysis application Atlas. ti. (2022) was used. Table 2 presents the deductive categories and subcategories from the focus group analysis of this study.

The category "previous academic status university studies" focuses on the analysis of the student's situation before university entrance. This category includes three subcategories, aimed at finding out which were the studies that allowed them to access the university ("access studies"), the university degree selected ("degree choice"), and the motivations that led to this choice ("motivations in the choice").

The category "academic situation during university studies" refers to the experiences of university students regarding their level of adaptation to the educational process. Within this category, subcategories are distinguished: "class attendance" in terms of regular class attendance; "university experience," which is related to the ways of planning, how to organize study, and the procedures used in resolving doubts; "decision to drop out"

TABLE 1   Distribution of students participating in this study.

Number of students	Gender	University degree
1	Female	Degree in Early Childhood Education
3	Female	Degree in Social Education
2	Male	Degree in Social Education
1	Male	Degree in Pedagogy
3	Female	Degree in Pedagogy
2	Female	Degree in Primary Education

Own elaboration.

TABLE 2 Deductive categories and subcategories.

Categories	Subcategories
Previous academic status university studies (PAS)	– Access studies (AS)
	– Degree choice (DC)
	– Motivations in the choice (MC)
Academic situation during university studies (ASD)	– Class attendance (CA)
	– University experience (UE)
	– Decision to drop out (DDO)
Causes of dropout (CD)	– Personal factors (PF)
	– Family factors (FF)
	– Economic factors (EF)
	– Work factors (WF)
	– Curricular and organizational factors (COF)
	– Identification with studies (IS)
Post-dropout trajectory (PDT)	– Combination study-work (CSW)
	– University re-entry (UR)
Suggestions for university permanence (SUP)	– Peer suggestions (PS)
	– University suggestions (US)

Own elaboration.

refers to the overall assessment of the university experience that leads them to consider dropping out of university studies.

The category "causes of dropout" refers to the various reasons that lead students to drop out of university studies. This category includes six specific subcategories: "personal factors" and "family factors," which refer, on the one hand, to the students' reasons for dropping out of university studies and, on the other hand, to the students' socio-family contexts as determining factors for dropping out of university studies, such as "work factors," such as students working in a professional job, which prevents them from combining work and studies; "economic factors," relating to the lack of resources to be able to cover the costs of university education; "curricular and organizational factors," which relate to the didactic and teaching planning variables that are part of each subject and that may trigger possible drop-out decisions, while the subcategory "identification with studies" allows us to understand the extent to which students identify with their studies and their professional projection.

The category "post-dropout trajectory" analyzes the future projections of students once they have initially left their studies. This category includes the subcategory "combination study-work," to find out to what extent the student has favorable conditions to reconcile academic and working life, and the subcategory "university re-entry," referring to decisions to return to university classrooms.

The category "suggestions for university permanence" includes the different recommendations offered both to other

students who are about to start higher education and to those responsible for university studies, to examine possible measures to help ensure that students stay on at the university.

4. Results

To present the results of this research, the most significant contributions of the participants have been analyzed by the categorization process and the objectives of this study. The participants' discourses were anonymized and coded to ensure confidentiality. The codes used to identify the participating students correspond to a Degree in Social Education (DSE), a Degree in Early Childhood Education (DECE), a Degree in Primary Education (DPE), and a Degree in Pedagogy (DP). In each of the extracted fragments, in addition to the degree, the gender of each of the participants has been included.

From the content analysis carried out with the Atlas. ti. (2022) application a semantic network has been obtained for the macrocategory "university permanence," in which the rest of the categories are related to the academic situation before and during university studies, the main reasons that led to dropping out, the post-dropout trajectory, and suggestions or guidelines to ensure university continuance (Figure 1).

The macrocategory "university permanence" is interconnected with the code curricular and organizational factors, being a central element from which other key subcategories converge, such as the decision to drop out due to personal, economic, family factors, and the combination of study–work. Another subcategory associated with "staying at university" is the choice of degree, which is identified with access to studies and motivation in the choice of these studies, which in turn, together with suggestions from the university and peers, influences the decision to drop out and university re-entry. The subcategories, class attendance and university experience, are directly related to work factors, curricular, and organizational factors, as well as identification with studies.

In the category "previous academic status university studies," three subcategories are presented that collect information on access studies (AS), degree choice (DC), and motivations in the choice (MC).

The participating students entered university either through Baccalaureate or through Higher Level Training Cycles. Among the reasons that led them to choose the degree, the students of DSE highlighted that it is a very necessary profession, with multiple areas and spaces for intervention, and that it can help in social transformation. In addition, one aspect to highlight from these students is that their choice of degree was conditioned by their personal experiences, which meant that they wanted to give an opportunity to people who find themselves in situations similar to those they had experienced, as well as a way of identifying and constructing their identity.

FIGURE 1
Semantic network of the macrocategory "university permanence".
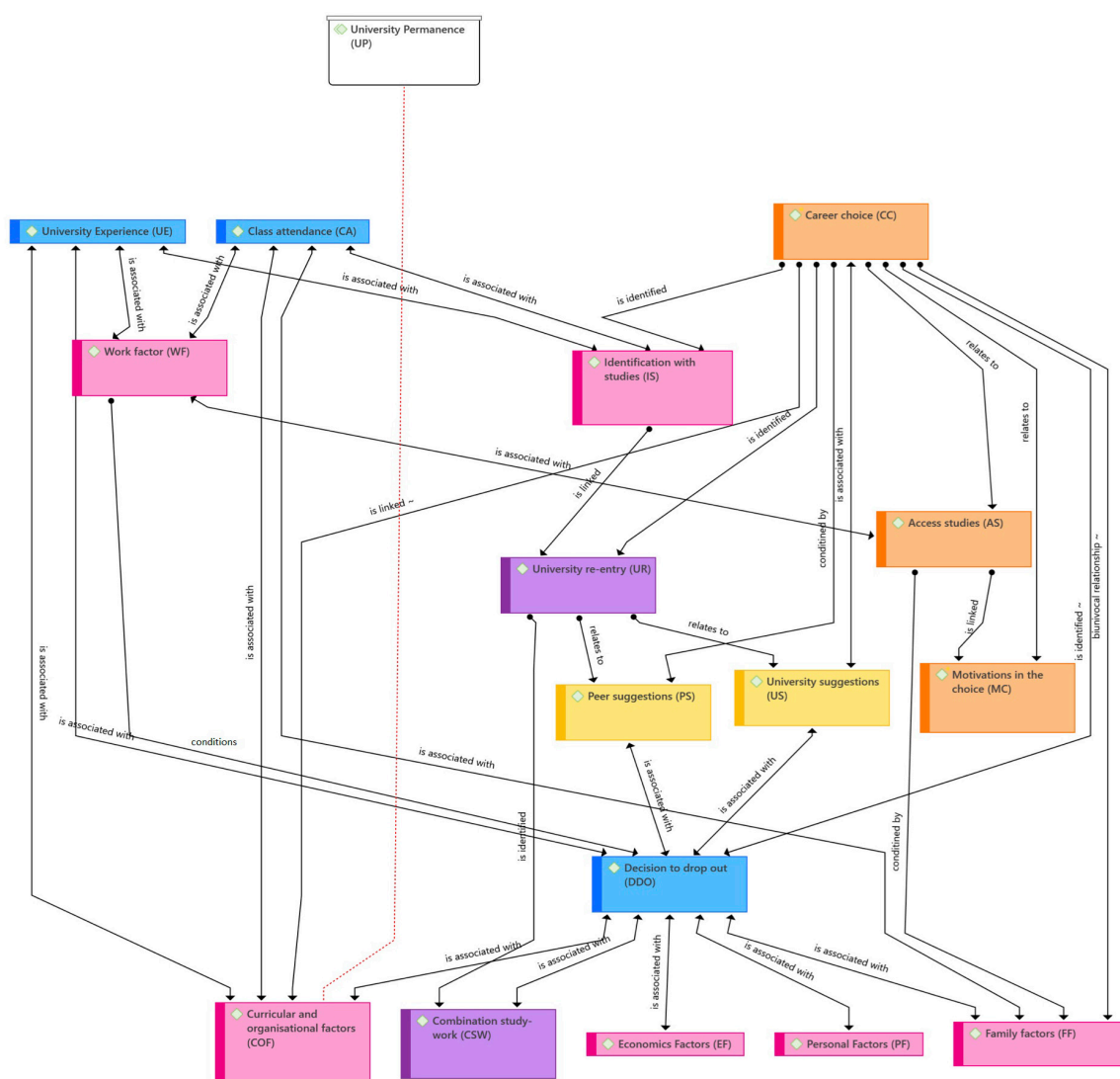
DSE student. *Well, the truth is that I have always wanted to be an educator, perhaps because of the life I have had, because of who I have been and who I am. It wasn't so much to get a degree as to acquire the professional skills that would allow me to undertake work in different workplaces to contribute to change and improve things.*

There are a variety of opinions about the students of the Degree in Early Childhood Education and Primary Education. On the one hand, the choice of this degree was random, to have a university degree and have greater possibilities to access the labor market, and on the other hand, due to vocational aspects, derived from a close relative who was a teacher, and who instilled in them an interest in teaching and preparing children at an early

age for their future life. Another relevant aspect was the desire to become a teacher to have a compatible timetable and to be able to reconcile work and family, as well as for holiday periods, salary, and professional promotion.

DSE student. *Actually, it was a bit of a "study for the sake of studying." I wanted to have a degree, go through university, and get a degree, thinking that all this would give me more opportunities and facilities to access the labor market in more stable and serious conditions than without having a degree.*

In the case of the students of the Degree in Pedagogy, they stated that in general, the choice of this degree was conditioned by the access grade, which did not allow them to access the Degree in Early Childhood Education, Degree in

Primary Education, or even the Degree in Psychology, so they had the idea of finishing the first year and then trying to re-enroll in the desired degree course.

Another emerging issue related to the choice of this degree was the possibility it offers to prepare for competitive examinations in educational guidance, which in one way or another, allows them to have direct contact with students of different ages, to provide them with personalized educational attention, and optimization of their learning. Also, noteworthy in the arguments of these students is the continuous demotivation during the first year of the degree, as they dealt with very general aspects of the profession that hardly allowed them to have direct contact with the practical reality of pedagogical professionals, in addition to the bewilderment about the specific functions of these professionals in educational centers, and, therefore, about job opportunities.

> DP student. *It was the degree course I managed to get into and the one that was closest to the one I really wanted to study, which was the degree in Early Childhood Education. But I was left out because I didn't have enough marks. My initial idea was to do the first year and then reapply for the one I really wanted, to see if I had better luck.*

From the category "academic situation during university studies," three subcategories are extracted, "class attendance (CA)," "university experience (UE)", and "decision to drop out" (DDO). The participating students from the different degree programs stated that they used to attend classes regularly at the beginning, but due to the COVID-19 pandemic, it was very hard for them to stop having contact with their classmates in person and the virtual classes were very boring and monotonous. They had to be online for long hours and the teaching methodologies were lecture-based, so they had little option to intervene. Another problem was internet access, as many of the participating students were from rural areas with poor connectivity, so they were unable to access the content and began to lose interest in the subjects. In addition to all this, they were overloaded with work and theoretical activities, which made it impossible for them to apply the content to real situations.

With regard to how they planned their studies, the participants generally stated that during classes they took notes, bought reference manuals for the subjects, and even expanded the information with documents available on the virtual campuses. When they had some doubts, in the beginning, they wrote an e-mail to the teacher, but as their doubts were not fully clarified, they relied on other classmates through social networks. Other students (Degree in Primary Education), referred to the fact that they wrote messages by e-mail to the teacher, but did not receive a reply and took advantage of the last minutes of the

class to ask questions. However, as time went on, in some subjects, they recognized that they were losing motivation, and they no longer followed up on the subject or asked questions, but instead requested the notes of the subject from other classmates with the intention of studying before the exam and having the possibility of passing. In this aspect, the students from different degree programs agreed that, together with other factors, motivation is an element that plays an essential role in the rethinking of abandoning a university degree.

> DP student. *At the beginning, I started with enthusiasm and attended classes regularly, but as time went by, I became disillusioned with the degree and turned off, I started to attend classes less, the subjects were very theoretical, and I didn't see the application to the practical field.*

> DP student. *I took notes, I downloaded all the documents and presentations from the Virtual Campus, and I even bought a book or two recommended by some professors.*

The category "causes of dropout" is made up of the subcategories "personal factors" (PF), "family factors" (FF), "work factors" (WF), "economic factors" (EF), "curricular and organizational factors" (COF), and "identification with studies" (IS). **Figure 2** presents an exemplification of a semantic network with empirical evidence of the deductive category "causes of dropout" that has been obtained from the inductive analysis of the documents. The arguments offered by the participants in this research suggest that the main reasons that led them to abandon their university studies include personal, economic, and university-related variables. In relation to the personal variables, the students of the Degree in Education alluded to the fact that they did not identify with their chosen degree and that it did not meet their initial expectations, all of which led to an identity crisis that led them to reconsider whether to continue studying or to opt for work. Some of the students (Degree in Social Education) stated that during the first year, they suffered a personal and identity crisis as they had conflicts with their parents or partners, which led them to repeatedly miss classes, reconsider other more attractive options, and even to drop out of their studies. Among these options, they highlighted looking for a job or taking competitive examinations to have a certain degree of professional stability in the short term rather than pursuing a university degree.

> DSE student. *I guess seeing myself working made me realize that the priority for my family at that time was to have several salaries, and I was a bit "forced" to work full time instead of continuing to attend school.*

FIGURE 2

Semantic network with empirical evidence for the category "causes of drop-out".
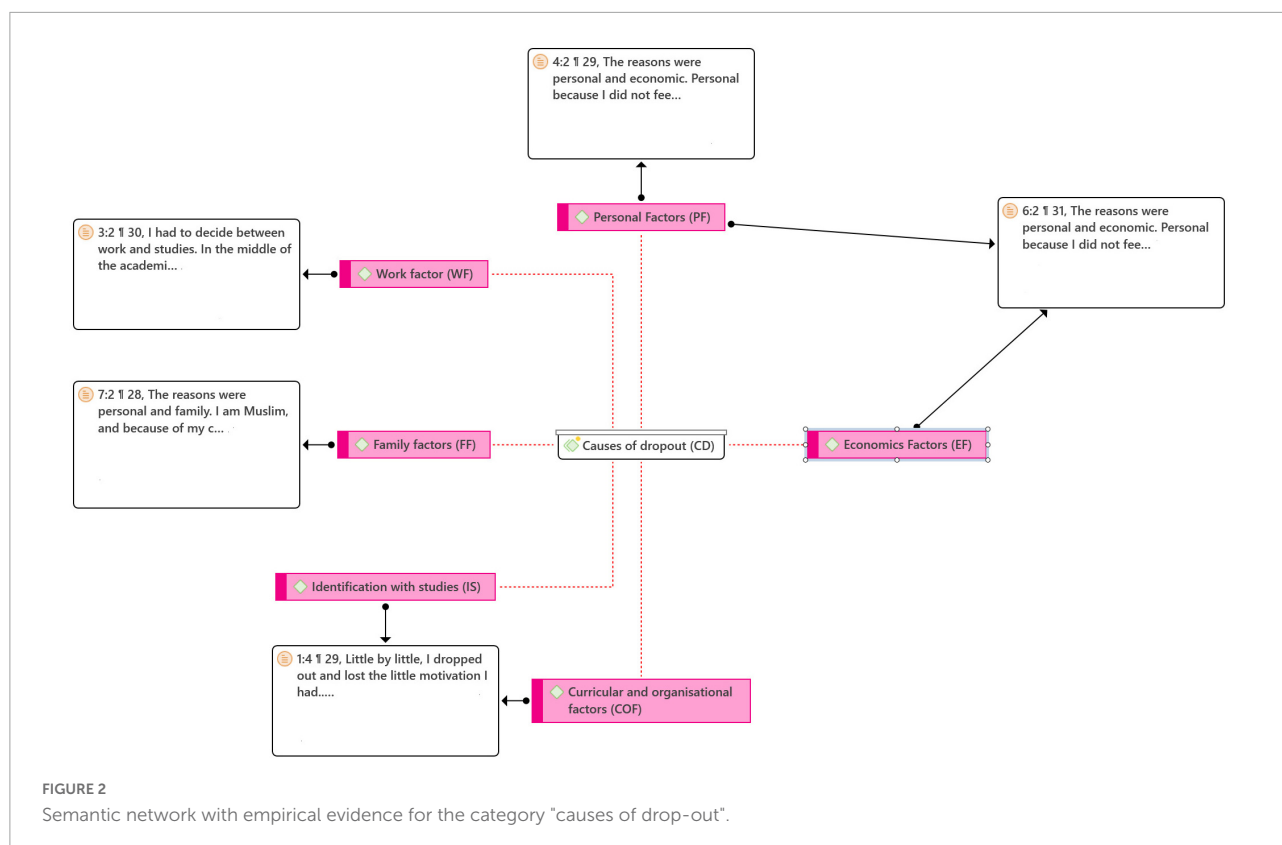
With regard to the economic variables, many students (Degree in Primary Education, Degree in Early Childhood Education, and Degree in Social Education) stressed the need to carry out a professional activity to contribute to the improvement of the family economy, as in many cases the students lived with their parents and siblings, which required them to contribute some extra income to maintain the expenses derived from university education. A student with a Primary Education Degree said that they not only had to pay the registration fees but also other expenses related to transport, curricular material, etc., as they did not have a scholarship for their studies.

> DECE student. *The reasons were personal and economic. Personal because I did not feel satisfied or identified with my studies. Economic because at home the income dropped, and it was necessary to think about working and even finding something stable that would help the economy at home to improve.*

> DPE student. *The reasons were personal, first. At home, my family never pressured me to work. In fact, they insisted that I should finish my degree quietly and told me that there was always time to work. But suddenly I found myself earning money, surrounded by children (which I liked) because I got a*

job as a school monitor, and I began to think that in the future I could get something better in the education sector. I tried to combine it all, but I couldn't. The pressure got the better of me. The pressure got the better of me and I decided to keep working.

For their part, with regard to the university course itself, the students agreed that there was a lack of motivation in specific subjects due to the excessively lecture-based teaching methodologies, which obliged them to be attentive in class to take notes, but did not give room for participation in the debate of ideas or discussions, as well as the inflexible attitudes of certain lecturers in offering alternatives that would allow them to combine study and work without having to give up their university education.

> DES student. *I lost motivation over time. The classes were boring and the lack of flexibility of the teachers helped me to quit.*

The category "post-dropout trajectory" includes two specific subcategories: "combination study-work" (CSW) and "university re-entry" (UR).

The students of the Pedagogy and Social Education Degree stated that they were aware that having a university degree could help them to get a job with greater professional projection and

stability. They also stated that they had classmates who, through instant messaging groups, told them that it was very difficult to work as a pedagogue in an educational center or as a social educator because there were many unemployed professionals and because of labor intrusion. They also commented that it was not only for this reason but also because some of these students had completed a higher degree in Social Integration, which allowed them to work in educational centers as monitors and perform the functions of a social educator in this case.

> DP student. *My cousin has studied the intermediate degree in Social Integration and is already working in a school, she has delighted her, but her professional figure is more welfare, but also performs functions of social educator, working more hours and earning less, so.*

The students in the Degree in Primary Education and Degree in Early Childhood Education emphasized that distance learning universities are a good opportunity to reconcile study with work. They also expressed the idea of returning to university studies later, but in a gradual manner, considering the possibility of enrolling in individual subjects based on prior contact with the teaching staff in charge to find out about possible ways of reconciling work and study.

> GSE alumnus. *As of today, I am still working, but my intention is to resume my studies next year. I have thought about enrolling in some individual subjects, and I will first review the guides and try to find out about the requirements, to start taking the subjects that will allow me to continue working.*

> DP student. *I am considering continuing to work because I know how difficult it is nowadays to get a job, but I also think that I can have more possibilities if I have a degree. Therefore, the option I am considering in the medium term is to enroll in a distance-learning university in Degree in Social Education, to get a degree, which, added to my work experience, could give me more options and career opportunities.*

The category "suggestions for university permanence" includes two subcategories: "Peer suggestions" (PS) and "University suggestions " (US).

With respect to the subcategory "Peer suggestions," the students of the Degree in Primary Education and the Degree in Pedagogy comment on the importance of planning and organizing study time each day, knowing in advance what possibilities the university offers to reconcile study and work, in the sense of being able to request to attend class part-time, for example, and if this is not feasible, consider studying at a distance-learning university.

> DPE student. *That they organize their study time well so that there is also time to enjoy time with family and friends. And if this is not possible, they should study at a non-attending university.*

On the other hand, the students of the Degree in Social Education emphasize analyzing from the outset what the professional opportunities are and what they really want to do in the future to avoid wasting unnecessary time and effort. They also suggest that, if they have chosen the degree they wanted, they should make the most of the classes and the teaching staff and also share experiences with other classmates.

> DSE student. *I would tell them to be fully involved in the subjects, that if they have entered the desired degree, they should give the best of themselves, and if they work, they should try to combine everything in the best way but evaluate what they really want to dedicate themselves to in the future.*

> GES student. *That they take advantage of the joy of sharing moments with their peers.*

Regarding the subcategory "university suggestions," the students in general stated that teachers should give more prominence to students, leaving aside traditionalist methodologies, favoring debate, participation, and group work. The participants in this study insisted on the importance of teachers teaching how to think, making classes more dynamic and rethinking the form of evaluation, and prioritizing comprehension over memorization. In this regard, they commented that it was necessary to revise the curricula to adapt them to the new demands and social needs.

> DSE student. *I think it is fundamental that students are active protagonists in the classes, that they can express themselves, that the subjects are designed as "dialogues," and that there is flexibility in the attitudes of teachers toward students who work but also want to study. The key, I think, is empathy, understanding, and flexibility.*

> DP student. *I think it is very important that teachers teach to think, that they make the classes dynamic, that they do not encourage memorization, but above all understanding, and that, instead of giving final exams, there should be eliminatory evaluation tests that allow us to study gradually and have a better chance of passing the subjects.*

Another aspect to highlight is the functionality of the contents given in the subjects so that they have practical applicability and a real professional projection. For example,

by inviting working professionals who can share their own experiences and thus provide a real vision of each workspace. They also state that it is essential to have student counseling services that explain from the first year what the professional opportunities associated with each degree are.

> DPE student. *That useful content for the performance of the profession is transmitted, and the main needs of the students are addressed, assessing each case, and trying to offer flexible solutions. I believe that the key is that the classes are dynamic, and the teachers are approachable and accessible.*

5. Discussion

This section presents the discussion of the results according to each of the categories and subcategories, maintaining a structure in accordance with the initial objectives.

5.1. Previous academic status university studies

Most of the participants in this study argue that the reasons that first motivated them to choose a university degree were related to vocational aspects. This data is consistent with the conclusive results of other research (Tinto, 1993; Esteban et al., 2016; Bernardo et al., 2019; Castro-López et al., 2021; Cervero et al., 2021), which emphasize the importance of having adequate counseling during schooling to reach the choice of higher studies that match personal interests and motivations.

The need to obtain a degree with which to have greater possibilities to access the labor market appears as another of the essential motivations provided by the participants in this research. These findings also appear in other studies (De la Fuente et al., 2017; Sánchez-Gelabert et al., 2020), in which it is emphasized that obtaining a degree constitutes a way to overcome the labor precariousness of employment that young people who lack a university degree must face.

Some of the participants who have taken part in this study have clarified that the grade obtained in the Spanish Baccalaureate has conditioned their access to the chosen degree since they have begun to take some studies seeking to validate later some subjects to try again to access the degree that really was the desired one. Along the same lines, we find other studies (Rodríguez et al., 2016; Venuleo et al., 2016; Rump et al., 2017) which show that some students begin undesired university studies to keep themselves busy and opt to change their degree the following year.

On the other hand, regarding the motivations for choosing a university degree, it is worth noting the influence exerted

by the families, who insisted that their sons and daughters opt for degrees already taken by some of their members. This is the case, for example, of the Degree in Early Childhood Education and the Degree in Primary Education. This issue has been seen in other studies (Clark and Dumas, 2016; Weis et al., 2016; Mostart and Pienaar, 2020; Tuero-Herrero et al., 2020), in which the value of family professions as a reference with which to acquire various professional skills is emphasized.

5.2. The academic situation during university studies

Most of the participants recognize that, although at the beginning they attended classes regularly, during their studies, they encountered certain difficulties in continuing with the same degree of involvement for various reasons: development of work activity, personal problems, and lack of motivation. Along the same lines, other studies (Acevedo, 2020; Casanova et al., 2022) warn that among some of the reasons for university dropout is the difficulty in reconciling study and work, in addition to a decrease in motivation and problems of identification with the studies, which leads to sporadic attendance in classes.

Another issue to highlight with respect to the ways of approaching the study on the part of the participants of this research is related to the planning and organization of the study. The students verbalized that they took notes on the subjects, expanding the information both with the contributions of their classmates and from the documents provided by the teachers in the virtual campuses of the subjects. This issue is also part of the data provided by other studies (Duque et al., 2013; Esteban et al., 2017), which emphasize the value of adequate planning and access to materials of interest as key aspects in the organization of the study of the various university disciplines.

Regarding the procedures used for the resolution of doubts, most of the students in this research admitted that to solve the various questions of the subjects they used e-mail as a means. Since they had little time due to their personal, work, or family situations, they could not do it in person. Likewise, they also relied on other classmates to ask about subject content through instant messaging groups. In this regard, they emphasized the importance of maintaining direct contact with teachers and being able to better understand the issues raised. Some studies (Garza-Moya et al., 2018; Lei et al., 2018) affirm the importance of direct contact with teachers and with peer groups to have the necessary support with which they can overcome the difficulties that may be generated throughout academic training.

The students who were part of the focus group of this study valued their university experience in a positive and

rewarding way at the beginning, although some of them said that they sometimes felt somewhat overwhelmed by the number of academic tasks to perform and the difficulties to combine all this with the performance of a professional activity or family reconciliation. In the same way, some students have recognized that those classes that were designed as a form of dialogues and shared meetings were essential to escape from certain personal problems and to continue with sufficient motivation to continue their university studies. These data are also collected in other studies (Nowell, 2017; Alcalá del Olmo et al., 2020), in which the use of active methodologies by teachers, their flexibility, and the creation of spaces that encourage students to play an active role are seen as factors in the prevention of university dropout.

5.3. Causes of dropout

Most of the students argue that the reasons that led them to drop out of college were personal, family, and economic.

Among the personal reasons was the search for personal identity in the face of studies that did not correspond to initial expectations. In addition, different problems associated with an identity crisis, conflicts between parents and children, or dating relationships led them to begin to reconsider dropping out of university for various reasons: to have more time to resolve these situations or also to look for a job that could guarantee them financial independence.

Among the economic and family reasons was the development of a full-time professional activity that prevented the reconciliation of study and work, together with the need to contribute to the improvement of the family economy in the face of job losses and precarious employment situations on the part of the parents. These results are consistent with other studies (Tinto, 1993; Mestan, 2016; Ghignoni, 2017; Lizarte, 2017; Tuero-Herrero et al., 2020; Constante-Amores et al., 2021), in which the need to develop a professional activity to contribute to the improvement of family income and dissatisfaction with the chosen degree in terms of the contents addressed and the methodology constitute factors located at the origin of university dropout.

Regarding curricular and organizational factors, it should be noted that the participants commented that, in most of the subjects, the teachers resorted to traditionalist methodologies, based on the transmission of theoretical content, without encouraging the active participation of the students. In addition, they highlighted the lack of practical applications of these contents in the professional contexts of intervention. In this regard, a study undertaken by Alcalá del Olmo et al. (2020) emphasizes that today, to increase student motivation, it is necessary to rethink certain methodologies that allow students

to become actively involved in social transformation projects based on service-learning experiences.

5.4. Post-dropout academic trajectory

Most of the students who took part in this research recognize that they have chosen to continue working after dropping out of university. However, most of them wish to resume their studies to overcome job instability and opt for better-paid jobs. In this regard, they admit to considering the possibility of enrolling in a distance-learning university to be able to reconcile study and work. These findings also form part of other studies (Sánchez-Gelabert, 2020; Sánchez-Gelabert et al., 2020), in which the advantages of studying in the distance mode in terms of mobility and flexibility, access to information, self-management, and optimization of technological resources are noted.

5.5. Suggestions for university permanence

The students have provided suggestions for young people who wish to begin their university studies, as well as for those in charge of higher education institutions.

In the first case, they emphasized the importance of making a good choice of studies, in terms of personal identification and professional opportunities, as well as planning and organizing study materials and time well. In this regard, they highlight the importance of being properly informed of the deadlines existing in the universities for requesting recognition of part-time students in the event of possible work activity.

In the case of the suggestions offered to university managers, the students emphasize the value of active and innovative methodologies, the flexibility and proximity of the teaching staff, as well as the design of learning spaces in which it is possible to meet the expectations and needs of the students. They also emphasize the value of functional learning, related to the social and professional reality, so it is important to open university classrooms to the community and meet its main needs from the particularities that define each degree. These results are also glimpsed in other studies (Cervero et al., 2017, 2021; Casanova et al., 2018b; Bernardo et al., 2019), in which the promotion of meaningful learning, the possibility of connecting theory with professional practice, and the updating of content addressed from the different disciplines constitute signs of excellence and university quality.

6. Conclusion

This study provides interesting data on the factors that influence the origin of university dropouts from the experiences

of students in the Faculty of Education Sciences at the University of Malaga (Spain). It also provides a series of recommendations aimed at preventing and guaranteeing continuity at the university.

Students who access their first-choice degree program are less likely to drop out of university studies because both the overall assessment of their experience and their identification with the studies themselves is positive (greater interest). However, various economic, personal, work, and family factors that did not exist at the beginning may converge and may condition the permanence of the student in that degree program. On the other hand, students who enter the degree program without having a clear professional and employment purpose are more likely to become demotivated and lose interest in the subject, since they do not feel identified with their studies or with their future employment, which is defined as uncertain. In addition, certain teaching methodologies, marked by lecturing and the inflexibility of the teaching staff, in terms of responding to the needs of the students, have a direct impact on the origin of university desertion.

In coherence with the results obtained and the scope of this study, it is recognized that there are certain limitations that should be considered for future research. We have only counted on the contributions of students belonging to the Degree in Primary Education, Degree in Early Childhood Education, Degree in Pedagogy, and Degree in Social Education. It would be more enriching to have the participation of students from other areas of knowledge and other autonomous communities, considering the social projection of university dropout and its relevance in today's knowledge society. Likewise, it would be appropriate to have the experiences of university professors that allow them to reflect on their own professional practice and from there, to be able to identify other ways of pedagogical intervention. Considering that we have chosen to use a qualitative methodology, based on the formation of a focus group, it would be necessary to incorporate other instruments for collecting information that would allow the triangulation of the data obtained with a quantitative methodology.

Finally, a decalogue of different recommendations and suggestions that may contribute to preventing desertion and guaranteeing university permanence, which has emerged from the analysis of the different assessments and arguments provided by the students, is provided:

- Reinforce educational guidance at the compulsory stage and provide continuity during the course of university studies.
- Early detection of university dropouts through student satisfaction surveys at different times during the academic year.

- Reinforcement of the tutorial action of the teaching staff to meet the demands of the students and respond to the main difficulties that may be detected.
- Use of emerging and innovative methodologies that favor the active participation of the students.
- Flexibility on the part of the university institutions for those students who wish to combine their studies with work and/or family.
- Close and direct contact of the teaching staff with the group of students to create a climate conducive to dialogue, critical thinking, group cohesion, and understanding rather than memorization.
- Practical applications of the theoretical contents addressed in the different subjects so that students can participate in socio-educational action projects with social transformation value.
- The first week of initiation in the university degree is essential to support an accompaniment to the students, to present the teaching guide, and available technological tools, such as the use of the virtual campus.
- To give greater rigor to the practicum course, where students can build meaningful learning by relating the contents previously taught in the subjects with the practical reality in which they interact.
- Greater visibility of counseling services for students to make them aware of the professional possibilities associated with each degree.
- Design educational policies that consider students in situations of special vulnerability, to make the principle of equal educational opportunities a reality.
- Encourage the formation of university research groups to study in depth the factors involved in university dropout, from those variables that affect the student body to those related to organizational and curricular factors in higher education institutions that contribute to ensuring university retention.

Data availability statement

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

Ethics statement

The approval of the Ethics Committee of the University of Málaga was requested before carrying out this study. This is a survey research study and therefore, according to national, international, and University of Málaga regulations, obtaining such approval is voluntary. As required by law, information will be provided to all participants. The researchers will not

exert any pressure on students to participate in this study. This work will comply with international and Spanish legislation and international reference documents, such as the Declaration of Helsinki. Participation will be voluntary and completely anonymous, complying with data protection law. The benefits of this research will be shared with local, national, and international stakeholders. The patients/participants provided their written informed consent to participate in this study.

Author contributions

JF and MM: Introduction and literature review. MS-V and MA: methodology and analysis of results. MS-V, MA, JF, and MM: discussion of results and conclusion and writing—review and editing. All authors contributed to each section of the manuscript and approved the submitted version.

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.

The reviewer JT declared a shared affiliation with the author MS-V to the handling editor at the time of review.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

Acevedo, F. (2020). Explanatory factors for dropout from higher education in unfavourable socio-academic contexts. *Rev. Española de Pedagog.* 78, 253–270. doi: 10.22550/REP78-2-2020-02

Alcalá del Olmo, M. J., Santos-Villalba, M. J., and Leiva, J. J. (2020). Active and innovative methodologies in the promotion of intercultural and inclusive skills in the university scene. *Eur Sci J.* 16, 6–23. doi: 10.19044/esj.2020.v16n41p6

Aranque, F., Roldán, C., and Salguero. (2009). Factors influencing university drop-out rates. *Comput. Educ.* 53, 563–574. doi: 10.1016/j.compedu.2009.03.013

Arce, M. E., Crespo, B., and Míguez-Álvarez, C. (2015). Higher education drop-out in spain-particular case of universities in galicia. *Int. Educ. Stud.* 8, 247–264. doi: 10.5539/ies.v8n5p247

Bäulke, L., Grunschel, C., and Dresel, M. (2022). Student dropout at university: a phase-orientated view on quitting studies and changing majors. *Eur. J. Psychol. Educ.* 37, 853–876. doi: 10.1007/s10212-021-00557-x

Behr, A., Giese, M., Teguim Kamdjou, H. D., and Theune, K. (2021). Motives for dropping out from higher education—An analysis of bachelor's degree students in Germany. *Eur. J. Educ.* 56, 325–343. doi: 10.1111/ejed.12433

Bernardo, A. B., Esteban, M., Cervero, A., Cerezo, R., and Herrero, F. J. (2019). The influence of self-regulation behaviours on university students intentions of persistence. *Front. Psychol.* 10:2284. doi: 10.3389/fpsyg.2019.02284

Bethencourt Benítez, J. T., Cabrera Pérez, L., Hernández Cabrera, J. A., Álvarez Pérez, P., and González Afonso, M. (2008). Variables psicológicas y educativas en el abandono universitario. *Electron. J. Res. Educ. Psychol.* 6, 603–621. doi: 10.25115/ejrep.v6i16.1298

Cabrera, L., Bethencourt, J. T., González, M., and Álvarez, P. (2006a). Un estudio transversal retrospectivo sobre la prolongación y abandono de estudios universitarios. *Rev. Electrón. Investig. Eval. Educ.* 12, 105–127. doi: 10.7203/relieve.12.1.4241

Cabrera, L., Tomás, J., Álvarez, P., and González, M. (2006b). The problem of University Dropout. *RELIEVE* 12, 171–203.

Casanova, J. R., Fernández-Castañón, A. C., Núñez, J. C., Bernardo, A. B., and Almeida, L. S. (2018b). Dropout in higher education: Impact of self-efficacy in dropout intention. *Rev. Bras. Orientaç. Prof.* 19, 41–49. doi: 10.26707/1984-7270/2019v19n1p41

Casanova, J., Cervero, A., Núñez, J. C., Almeida, L. S., and Bernardo, A. (2018a). Factors that determine the persistence and dropout of university students. *Psicothema* 30, 408–414. doi: 10.7334/psicothema2018.155

Casanova, J. R., Gomes, A., Moreira, M. A., and Almeida, L. S. (2022). Promoting success and persistence in pandemic times: An experience with first-year students. *Front. Psychol.* 13:815584. doi: 10.3389/fpsyg.2022.815584

Castaño, E., Gallón, S., and Vásquez, J. (2008). Análisis de los factores asociados a la deserción estudiantil en la educación superior: Un estudio de caso. *Rev. Educ.* 345, 255–280.

Castro-López, A., Cervero, A., Galve- González, C., Puente, J., and Bernardo, A. B. (2021). Evaluating critical success factors in the permanence in Higher Education using multi-criteria decision making. *High. Educ. Res. Dev.* 41, 628–646. doi: 10.1080/07294360.2021.1877631

Cervero, A., Bernado, A., Ellián Tuero, A. B., Carbajal, R., and Númez, J. C. (2017). Influencia en el abandono universitario de variables relacionales y sociales. *Rev. Estud. Investig. Psicol. Educ.* 12, 1–4. doi: 10.17979/reipe.2017.0.12.2531

Cervero, A., Galve-González, C., Blanco, E., Casanova, J. R., and Bernardo, A. B. (2021). Initial experiences in university, how do they affect to the intention to drop out? *Rev. Psicol. Educ.* 16, 161–172. doi: 10.23923/rpye2021.02.208

Clark, I., and Dumas, G. (2016). The regulation of task performance: a transdisciplinary review. *Front. Psychol.* 6:1862. doi: 10.3389/fpsyg.2015.01862

Colá, P. (2015). El abandono universitario. *Rev. Fuent.* 16, 9–14. doi: 10.12795/revistafuentes.2015.i16

Conferencia de Rectores de Universidades Españolas (CRUE) (2017). *La universidad española en cifras 2016-2017*. Available online at: https://www.crue.org/wp-content/uploads/2020/02/2018.12.12-Informe-La-Universidad-Espa%C3%B1ola-en-Cifras.pdf (accessed September 25, 2022).

Constante-Amores, A., Florenciano Martínez, E., Navarro Asencio, E., and Fernández-Mellizo, M. (2021). Factors associated with university dropout. *Educación XX1* 24, 17–44. doi: 10.5944/educxx1.26889

De la Fuente, J., Sander, P., Martínez-Vicente, J. M., Vera, M., Garzón, A., and Fadda, S. (2017). Combined effect of levels in personal self-regulation and regulatory teaching on meta-cognitive, on meta-motivational, and on academic achievement variables in undergraduate students. *Front. Psychol.* 8:232. doi: 10.3389/fpsyg.2017.00232

Duque, L. C., Duque, J. L., and Surinach, J. (2013). Learning outcomes and dropout intentions: An analytical model for Spanish universities. *Educ. Stud.* 39, 261–284. doi: 10.1080/03055698.2012.724353

Esteban, M., Bernardo, A. B., and Rodríguez- Muñiz, L. J. (2016). Permanencia en la universidad: la importancia de un buen comienzo. *Aula Abierta* 44, 1–6. doi: 10.1016/j.aula.2015.04.001

Esteban, M., Bernardo, A., Tuero, E., Cervero, A., and Casanova, J. (2017). Variables that influence academic performance and university persistence. *Eur. J. Educ. Psychol.* 10, 75–81. doi: 10.1016/j.ejeps.2017.07.003

European Commission (2020). *Europe 2020 targets: statistics and indicators for Spain*. Available online at: https://education.ec.europa.eu/es/education-levels/school-education/early-school-leaving? (accessed September 25, 2022).

Faas, C., Benson, M. J., Kaestle, E. C., and Savla, J. (2018). Socioeconomic success and mental health profiles of young adults who drop out of college. *J. Youth Stud.* 21, 669–686. doi: 10.1080/13676261.2017.1406598

Garza-Moya, L. R., Tovar, C. R., Arreola, J. M., and Rodríguez, F. B. (2018). Group cohesion, key strategy to reduce the dropout rate to the first school cycle in higher education. *ECORFAN Journa-Spainl* 5, 26–32.

Ghignoni, E. (2017). Family background and university dropouts during the crisis: The case of Italy. *High. Educ.* 73, 127–151. doi: 10.1007/s10734-016-0004-1

Gilardi, S., and Guglielmetti, C. (2011). University life of non-traditional university life of non-traditional students: engagement styles and impact on attrition. *J. High. Educ.* 82, 33–53. doi: 10.1080/00221546.2011.11779084

González González, T. (2006). Absentismo y abandono escolar: Una situación singular de exclusión educativa. *Rev. Electrón. Iberoamer Sobre Calidad, Eficacia Cambio Educ.* 4, 1–15.

González, L. E., and Uribe, D. (2018). Estimaciones sobre las "repitencia" y deserción en la Educación Superior Chilena. Consideraciones sobre sus implicaciones. *Calidad Educ.* 75–90. doi: 10.31619/caledu.n17.408

González-Ramírez, T., and Pedraza-Navarro, I. (2017). Social and families variables associated with university drop-out. *Educatio Siglo XXI* 35, 365–388. doi: 10.6018/j/298651

Instituto Nacional de Estadística (INE) (2020). *Tasa de abandono escolar temprano*. Available online at https://www.ine.es/jaxiT3/Tabla.htm?t=12543 (accessed September 17, 2022).

Jae Kyung, K. (2022). A study on factors affecting college dropout intention: An hybrid approach of topic modeling and structural equation modeling. *J. korea Soc. Indust. Inf. Syst.* 27, 81–92.

Lei, H., Cui, Y., and Chiu, M. M. (2018). The relationship between teacher support and students' academic emotions: A meta-analysis. *Front. Psychol.* 8:2288. doi: 10.3389/fpsyg.2017.02288

Lizarte, E. J. (2017). Biographical trajectory of a student who dropout Pedagogy at the University of Granada. *J. Educ. Teach. Train.* 8, 267–282.

López-Cózar-Navarro, C., Benito-Hernández, S., and Priede-Bergamini, T. (2020). Un análisis exploratorio de los factores que inciden en el abandono universitario en titulaciones de ingeniería. *Rev. Docencia Univ.* 18, 81–96. doi: 10.4995/redu.2020.13294

Mestan, K. (2016). Why students drop out of the Bachelor of Arts. *High. Educ. Res. Dev.* 35, 983–996. doi: 10.1080/07294360.2016.1139548

Ministerio de Educación Cultura y Deporte (MECD) (2015). *Datos y cifras del sistema universitario español.* Madrid: Secretaría General Técnica.

Mostart, K., and Pienaar, J. (2020). The moderating effect of social support on the relationship between burnout, intention to drop out, and satisfaction with studies of first-year university students. *J. Psychol. Afr.* 30, 197–202. doi: 10.1080/14330237.2020.1767928

Nowell, C. (2017). The influence of motivational orientation on the satisfaction of university students. *Teach. High. Educ.* 22, 855–866. doi: 10.1080/13562517.2017.1319811

Páramo, G. J., and Correa, C. A. (1999). Deserción estudiantil universitaria. Conceptualización. *Rev. Univ. Eafit* 35, 65–78.

Pérez, F., and Aldás, J. (2022). *Indicadores sintéticos de las universidades españolas, Valencia: Fundación BBVA-Instituto Valenciano de Investigaciones Económicas*. Available online at. https://www.fbbva.es/wp-content/uploads/2019/04/Informe-U-Ranking-FBBVA-Ivie-2019.pdf (accessed September 12, 2022).

Portal Martínez, E., Arias Fernández, E., Lirio Castro, J., and Gómez González, J. L. (2022). Fracaso y abandono universitario: percepción de los(as) estudiantes de Educación Social de la Universidad de Castilla La Mancha. *Rev. Mex. Investig. Educ.* 27, 289–316.

Powazny, S., and Kauffeld, S. (2021). The impact of influential others on student teachers' dropout intention – a network analytical study. *Eur. J. Teach. Educ.* 44, 520–537. doi: 10.1080/02619768.2020.1793949

Rodríguez, M. C., Peña, J. V., and Inda, M. M. (2016). Esto es lo que me gusta y lo que voy a estudiar: Un estudio cualitativo sobre la toma de decisiones académicas en bachillerato. *Rev. Complut. Educ.* 27, 1351–1368. doi: 10.5209/rev_RCED.2016.v27.n3.48518

Rump, M., Esdar, W., and Wild, E. (2017). Individual differences in the effects of academic motivation on higher education students' intention to drop out. *Eur. J. High. Educ.* 7, 341–355. doi: 10.1080/21568235.2017.1357481

Sánchez-Gelabert, A. (2020). Non-Traditional students, university trajectories, and higher education institutions: A comparative analysis of face to face and online universities. *Stud. Paedagog.* 25, 51–72. doi: 10.5817/SP2020-4-3

Sánchez-Gelabert, A., Valente, R., and Duart, J. M. (2020). Profiles of online students and the impact of their university experience. *Int. Rev. Res. Open Distribut. Learn.* 21, 230–249. doi: 10.19173/irrodl.v21i3.4784

Sosu, E. M., and Pheunpha, P. (2019). Trajectory of university dropout: Investigating the cumulative effect of academic vulnerability and proximity to family support. *Front. Educ.* 4:6. doi: 10.3389/feduc.2019.00006

Stiller, D., and Bachmaier, R. (2017). Dropout in an online training for trainee teachers. *Eur. J. Open Dis. E-learning* 20, 80–94. doi: 10.1515/eurodl-2017-0005

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *J. High. Educ.* 45, 89–125. doi: 10.3102/00346543045001089

Tinto, V. (1993). Reflexiones sobre el abandono de los estudios superiores. *Perfiles Educ.* 62, 56–63.

Tinto, V., and Russo, P. (1994). Coordinated studies programs: Their effect on student involvement at a community collage. *Commun. Coll. Rev.* 22, 16–25. doi: 10.1177/009155219402200203

Torrado, M. (2012). *El fenómeno del abandono: el caso de ciencias de experimentales en la Universidad de Barcelona.* [Doctoral Thesis]. Barcelona: University of Barcelona.

Tuero-Herrero, E., Ayala- Galavís, I., Urbano-Contreras, A., Herrero-Diez, F. J., and Bernardo-Gutiérrez, A. B. (2020). Intención de abandonar la carrera: Influencia de variables personales y familiares. *Rev. Fuent.* 22, 142–152. doi: 10.12795/revistafuentes.2020.v22.i2.05

Urbina, J. E., and Ovalles, G. A. (2016). Abandonment and permanency in higher education: An application of Founded Theory. *Sophia* 12, 27–37. doi: 10.18634/sophiaj.12v.1i.290

Velasco Poveda, J. C., Velasco Poveda, I. M., and España Irala, I. (2020). Analysis of student dropout at a public university in Bolivia. *Rev. Iberoam. Educ.* 82, 151–172. doi: 10.35362/rie8223572

Venuleo, C., Mossi, P., and Salvatore, S. (2016). Educational subculture and dropping out in higher education: a longitudinal case study. *Stud. High. Educ.* 41, 321–342. doi: 10.1080/03075079.2014.927847

Viale, H. E. (2014). Una aproximación teórica a la deserción estudiantil universitaria. *Rev. Dig. Investig. Docencia Univ.* 8, 59–75. doi: 10.19083/ridu.8.366

Weis, M., Trommsdorff, G., and Muñoz, L. (2016). Children's self-regulation and school achievement in cultural contexts: the role of maternal restrictive control. *Front. Psychol.* 7:722. doi: 10.3389/fpsyg.2016.00722

Zandomeni, N., Canale, S., Pacifico, A., and Pagura, F. (2016). El abandono en las etapas iniciales de los estudios superiores. *Cienc. Docencia Tecnol.* 27, 127–152.

Check for updates

The impact of academic dropout at the University of Granada and proposals for prevention[1][2]

Daniel González-González[1], María Arias-Corona[2]*,
Antonio Cárdenas-Cruz[3] and Alejandro Vicente-Bújez[4]

[1]Department of Research Methods and Diagnosis in Education, Faculty of Educational Sciences, University of Granada, Granada, Spain, [2]Department of Didactics and School Organization, Faculty of Educational Sciences, University of Granada, Granada, Spain, [3]Department of Medicine, Faculty of Medicine, University of Granada, Granada, Spain, [4]Department of Didactics of Musical, Plastic and Corporal Expression, Faculty of Educational Sciences, University of Granada, Granada, Spain

Persistence and dropout are two sides of the same coin. Together with personal and social factors, issues associated with the quality of teaching provided by universities determine students' decision to persist in pursuing their academic degree or, on the contrary, to drop out of university studies. Our working hypothesis is that the impact on improving the quality of teaching by considering pedagogical factors which are currently being researched and experimented with, can improve the overall persistence rate by reducing the dropout rate. Our work consisted of applying an instrument designed to diagnose the risk of dropping out of university studies to a sample of first-year university students at the University of Granada. The instrument was applied at the beginning of the second semester. Of the 642 pupils surveyed, we established a risk group of 20 students. In this preliminary study we intend to make a first approach to the phenomenon of academic failure in Andalusian universities from the prediction and diagnosis of risk groups and the recommendation of preventive measures. Among the measures we propose for prevention, we highlight those that have an impact on pedagogical factors. We propose measures targeting the factors that predict dropout and the implementation of preventive measures.

1 Note 1.
This article is based on research with reference number B-SEJ-516-UGR18 approved in the FEDER R+D+i Andalusia 2014−20 call for projects.
2 Note 2.
This research was approved by the Research Ethics Committee of the University of Granada with registration number 2778/CEIH/2022.

1. Introduction

The adoption of the European Higher Education Area (EHEA) has led to the acceptance of new challenges for the Spanish education system, which has been forced to turn its attention to ways of increasing educational quality and continuous improvement (Le et al., 2020; Cervero et al., 2021). Within the framework of the strategic actions adopted for the European Union as a whole, the objective is to increase the percentage of young people with university degrees, so that the completion of university studies is nowadays a priority, which requires actions that make it possible for students

not only to access university, but also to maintain their commitment throughout this academic stage and successfully complete it (Roberts, 2011).

This research investigates academic dropout during university education among first-year students at university level with the aim of gaining in-depth knowledge of the causes of the phenomenon and based on its delimitation, to facilitate the programming of lines of action that allow it to be tackled.

The agreed definition of university dropout is characterised by the following variables: the dropout of the student from the university degree in which he/she has enrolled without having passed the requirements for graduation and, correlatively, the absence of new enrolments in other degrees at the same educational level in the following 2 years (Godor, 2017). For Fonseca-Grandón (2018), the first university year is the most important in the student's academic trajectory because it is during this year that the links with the institution are created and the student's commitment to their education is generated. It is during this year that the highest drop-out rate is quantified and, therefore, it should be seen as a critical period in which strategies aimed at retaining students should be drawn up, encouraging them to stay at the university.

Statistics that have so far quantified university dropout have described it as a problem of significant magnitude that, depending on the country in question, fluctuates between 10 and 50% of those enrolled in their first year of university. OECD countries put the average dropout rate during the first year of university at 24%, although it should be noted that in countries such as Brazil this rate exceeds 50% (Bonaldo and Pereira, 2016). In Spain, the latest available data establish the dropout rate at 33.9%, being higher in public universities, where it reaches 35% of enrolments (Cervero et al., 2021). For Roberts (2011) these rates show that the contemporary university system needs to move away from its traditional focus on finding strategies to attract new students and focus on finding ways to ensure that those students who are interested in its educational services do in fact complete their education. Indeed, for the author, it is no longer necessary for the university to aim to increase the enrolment rate, since access to higher education is guaranteed for almost anyone who wants it, the objective being that the academic guidance offered at the university should be adapted to the needs and characteristics of the students who enrol in order to ensure that the highest possible percentage of students successfully complete their studies.

Academic dropout is an object of research on which the academic literature has focused with special emphasis in recent years, given its correlation with various economic and welfare indicators in the general population. Indeed, dropping out of higher education is a phenomenon whose consequences can be tracked in multiple social and productivity aspects of the societies in which it occurs, making it a problem that is a priority to be resolved by both education systems and social systems alike (Le et al., 2020). In justifying the importance of action to curb the incidence of university failure and dropout, studies such as that of Portal Martínez et al. (2022) underline the magnitude of its effects both at the microeconomic level for those who suffer from it and at the macroeconomic and social level. In this respect, countries where the dropout rate is higher experience a direct effect on their well-being and quality of life indicators, as well as a lower capacity for innovation.

Previous studies have linked academic dropout to a very complex web of causes that interact with personal, academic, pedagogical, organisational and social dimensions (De Castro Lima Baesse et al., 2016; Godor, 2017; Pierella et al., 2020). The diversity of factors that may influence the decision about whether or not to continue with university

life makes it complex to design and establish strategies aimed at reducing the prevalence of this phenomenon. Moreover, there is no full consensus in the academic literature regarding possible approaches to university dropout, given the influence of contextual, individual and institutional variables on the dropout experience. For this reason, limiting the research to a specific environment has been envisaged as a way to be able to dimension the nature of the problem more precisely in a specific context and, from this environment, to be able to plan responses in accordance with the needs that have materialised.

1.1. The importance of dropout during the first year of university

Concern about student dropout has increased in recent years and the current understanding of this phenomenon allows better approaches to be designed to reduce it in the near future. According to De Castro Lima Baesse et al. (2016), concern about university dropout is at its peak today, especially as educational institutions compete with each other to attract more students, under new management models focused on maximising the quality of their actions to achieve the best results. The first year of university is a challenge for students because it requires them to make a choice that will have a great impact on the individual, considering aspects such as their vocation, expectations, abilities and opportunities when choosing the most suitable degree (Le et al., 2020). In this context, dropout from higher education is most prevalent during the first year of university, and this has been associated with a number of causes that require students to make an extra effort to adjust to the education they are undertaking.

These causes may be inherent to the university system, such as the organisation of academic processes or the didactic approach from which teaching-learning actions are designed, they may involve factors related to the students themselves, such as their intrinsic motivation towards education, their ability to adapt to the environment or their cognitive flexibility, or they may comprise mixed dimensions, a category which includes all those situations and experiences in whose configuration both the education system and the way in which the individual faces it participate (Le et al., 2020). Specifically, during the first year, students adapt to the new learning system and have to learn to manage their time and learn new work processes, under methodologies with which they may not be familiar (Cohen, 2017).

According to Cervero et al. (2021), university dropout, being a multi-causal problem, cannot be solved with a single strategic measure, so that the strategies adopted to reverse it must be multiple, affecting the different dimensions that cause it. In line with these contributions, it has been suggested that in order to predict student dropout at university, research needs to be proposed based on various hypotheses that can explain the extent to which the various variables that shape the student's experience at university play a role in their decision to leave their studies, drawing up risk profiles based on the likelihood of this decision materialising Portal Martínez et al., 2022. In this respect, research suggests that the process of making the decision to drop out of university is complex and involves different stages, from the first moment the student feels the desire to drop out or considers the possibility of dropping out, until he or she finally acts and decides to take this step.

The difficulty in deepening understanding of this process lies in the fact that while it is materialising, the student continues to maintain a link with the university organisation and responds to the various stimuli that occur at both the affective and social levels. In addition, this relationship

of the student to the university is also shaped by their prior motivation to undertake university studies, their expectations of what to expect when they complete their education and their beliefs about their own competence to achieve this goal. Godor (2017) has highlighted the weight of factors related to the student's integration in the institution on the decision to drop out, which places the role played by the group of which he or she is a part at the centre of the analysis and, complementarily, suggests that it is important the university takes an interest in creating social communities that are built as the core of learning actions. In this respect, the social nature of learning and the fact that it takes place in a scenario involving a set of actors (students, teachers, professionals), requires the creation of guided meeting points that help to increase the feeling of belonging and are capable of influencing students' adherence to the educational practices and policies that are designed.

1.2. Pedagogical actions as a means of preventing university dropout

According to Portal Martínez et al. (2022), pedagogical actions aimed at the prevention of university dropout are one of the strategic methods that can be implemented to increase students' commitment to their chosen course. Among these actions are those that increase students' involvement in the academic process through the creation of meeting points with teachers and peers, as well as reinforcement and guidance mechanisms that ensure greater student support.

These actions can be combined with innovative methods, such as the use of ICT or social media networks, to increase their level of effectiveness and better support the learner during their academic progress (Le et al., 2020). In addition, the use of statistical analysis tools and monitoring strategies that can be incorporated when these actions are implemented using digital resources makes it easier to audit the performance achieved by each action, so that it is easier to determine which are effective and how to optimise those that do not achieve full learner engagement.

De Castro Lima Baesse et al. (2016) have suggested that the design of flexible mechanisms in the university system is essential to ensure that students can adapt their interests, characteristics, and learning styles and paces to the opportunities provided by the educational institution, so that the freedom granted to students is key to fostering their adherence to academic practices and, thus, to their academic success. In this context, Godor (2017) suggest that the monitoring offered to students to measure their ongoing progress and to supply them with feedback is very important because it becomes a factor of support and assistance, extrinsically motivating the student by making visible the link between their effort and their results. Particularly during the first year of university, when students are not yet familiar with how this level of education works, being able to understand how their actions influence their outcomes can encourage them to engage more deeply in their education and demonstrate more proactive attitudes, with the university providing these feedback mechanisms to students (Laato et al., 2019).

2. Methods

2.1. Objectives

The study presented here is part of the research project on academic failure and dropout in Andalusian universities, financed by FEDER funds.

In this study we propose making a first approach to the phenomenon of academic failure and dropout in the teaching degree and others in Andalusian universities from a predictive and diagnostic perspective of the groups at risk.

2.2. Process

The study consisted of applying an instrument to diagnose the risk of dropping out of university studies to a sample of first-year university students enrolled at the University of Granada in different degree courses. The tool was distributed at the beginning of the second semester so that students would have already had a preliminary six-month period of contact with the degree programme, which is essential for them to understand whether their expectations of the academic process are realistic, as well as to get to know the institution and integrate socially and academically. To recruit participants, the questionnaire was provided to entire groups of students whose teacher showed interest in collaborating with our research. The sampling technique, therefore, consisted of the distribution of the research instrument by convenience, akin to the non-probability sampling process.

2.3. Participants

The diagnostic instrument was applied to 642 first year students of the University of Granada studying different degrees in different faculties like Early Childhood Education, Primary Education, Social Education, Pedagogy, Nursing, Business Administration and Management, Physical Activity and Sports Sciences, Telecommunications, Industrial Engineering, Engineering of Canals and Ports and double degree in Primary Education and English Studies belonging to various faculties such as the Faculty of Education Sciences, Health Sciences, Sciences of Physical Activity and Sports, School of Telecommunications, Economics and Business Sciences, Faculty of Law, Faculty of Sciences and School of Engineering of Canals and Roads. The average age of the student body is 19.66 years, of which 80.4% (516) are women and 19.6% (126) are men.

2.4. Instrument

The "Survey on Successful Student Retention" by Velázquez and González (2017), which the authors applied to a population of nursing students at the Unidad Académica Multidisciplinaria Matamoros of the Universidad Autónoma de Tamaulipas, was used to detect subjects at risk of university failure and dropout.

The instrument has been slightly edited to adapt the wording to the Spanish context, excluding two of the 73 items proposed by the authors as they were not considered to be relevant in the context of this exploration. Therefore, the tool administered consisted of a survey composed of 71 items, which was complemented by 6 further questions through which we attempted to collect some socio-demographic data from the participants. The items that make up the tool present a 5-degree Likert-type scale on which the student positions themself according to their degree of agreement or disagreement with the statement presented.

The survey was provided to students *via* an online access link to a Google questionnaire, so no method was used to keep the attention of the subjects.

The selection of an instrument of this type in order to determine potential factors that condition educational failure and, in the light of these, identify which groups could be at greater risk of suffering from it due to their particular characteristics, responds to the interest of the education system in anticipating this phenomenon and acting preventively, implementing actions that will have a positive impact on the persistence of students. Furthermore, such a tool helps to identify measures that may be effective in reducing failure and dropout in higher education.

The instrument has already been applied and validated in previous research. Subjects who left any questionnaire field unanswered were eliminated from the data matrix prior to analysis. Regarding the reliability of the data from our sample of subjects, Cronbach's alpha yields a value of 0.90 (very reliable data) for the total set of items and with the following values for the factors motivation (0.89), commitment (0.88), attitude and behaviour (0.93), and socioeconomic conditions (0.86).

The instrument developed by Velázquez and González (2017), distributes the items around four factors that, in turn, are broken down into 12 categories from which the individual's commitment to their academic project can be interpreted in a positive sense and, from a negative perspective, the risk of failure can be identified. These factors, associated with their categories, are listed in Supplementary Table 1 and are as follows: motivation, commitment, attitude and behaviour, and socio-economic conditions.

Responses were obtained from 642 students enrolled in various degrees at the University of Granada. The average age of the participants was 19.66 years. 80.5% of the participants were male and 19.3% female, leaving 0.2% unidentified.

The items that achieved a mean score of less than 3.00 in the study are listed below. These cover eight areas, and they are mainly related to pedagogical factors, which highlights the lack of attention paid to these dimensions in the university system in which the students who took part in the research participate.

The variables in which students scored lowest in the study are related to the coordination of the teaching activity and the pedagogical strategies implemented in the educational institution, which are factors that, according to the findings of this research, could ostensibly be improved at the University of Granada. Specifically, students are dissatisfied with the organisation of classes and the tutorial action strategies developed, as well as with the assessment methods used in the institution, the approach to classes, the recognition of their teachers and the feedback they receive. Of the 642 students surveyed, we established a risk group of 20 students, for whom it would be necessary to design measures targeting the factors that predict dropout and implement preventive measures.

In contrast to the results obtained for the lowest scoring items, which corresponded to pedagogical dimensions, the highest scoring variables are related to psychological and contextual factors influencing the students. In the light of the results that have been established, it is evident that the prevention of early university dropout requires that pedagogical factors be addressed by the education system, which currently show a significant deficit among the students who participated in the study. Thus, students enrolled in the first year of university at the institution where the research was carried out show a high intrinsic motivation towards the degree and towards the professional options to which it gives access, expressing high expectations for their future employment. The questionnaire also revealed a high level of integration of students in their respective faculties, participating in the social networks that are promoted in the university system, which are mainly made up of teachers, students and other staff working at the university. A factor strongly linked to academic engagement is represented by class attendance, which in the selected sample is very high and may contribute to academic success, as this dimension correlates with educational performance.

3. Discussion

University dropout is a problem that makes it difficult for students to achieve their career aspirations and attain an optimal standard of living, as it deprives them of those opportunities that depend on obtaining a higher education qualification (Anyanwu and Iwuamadi, 2015; Mestan, 2016; Le et al., 2020; Respondek et al., 2020). In addition to having a strong psychological impact on the student, it is also associated with an investment that brings no return, both at the individual level and for the education system, which is why addressing this phenomenon is essential for today's society (Perez et al., 2018; Solis et al., 2018). According to Canty et al. (2020), researchers studying the problem of university dropout face several challenges, including the difficulty of obtaining reliable data that help to understand what possible strategies can be efficient, the lack of attention paid by the university system to this issue, and the influence of socio-demographic factors and personal variables in the configuration of this phenomenon. The influence of these factors makes it difficult for universities to act in a preventive manner in the face of university failure and the consequent dropout of students, especially because the diagnosis of at-risk profiles requires a period of time spent at the university and, precisely, the decision to drop out takes place mainly during this first contact, concentrated in the first academic year.

This first access to university involves a stage that requires the individual to build his or her strategies for adapting to the social and organisational space as well as to the demands of the degree. This process can develop with different levels of success depending on the student's characteristics and existing skills, and this may hinder university integration in those who experience more difficulties in socialising or who, due to their psychological characteristics, do not maintain the level of intrinsic motivation necessary to continue in the process, leading to a higher probability of failure (Gregori et al., 2018). Furthermore, according to Mestan (2016), there are a number of factors that the university does not have the capacity to intervene in, such as the financial capacity of students, the emergence of alternative employment opportunities, health problems or other changes in their lives that may be particularly impactful during the first year, as the lack of full adjustment to university life may make students more sensitive to these changes.

Ideas of giving up their course may be common among first-year university students, but they do not always materialise in dropping out because most individuals have a complex web of strengths that help them overcome difficulties (Frémont and Arnal, 2021; Mtshweni, 2022). Factors supporting continuity include having financial resources, participating in active teaching methods that are associated with assessment processes in which effort is valued through understandable and fair procedures, and receiving support from their teachers and peers. Likewise, coming to class and staying connected to the learning process helps to maintain the link with the process and, in this way, encourages commitment so that the student's effort lasts over time and helps them to pass the different subjects that make up the curriculum.

According to Gregori et al. (2018), distance learning universities and, in general, subjects with an online or blended programme have the

highest dropout rate, which can be as high as 64.5%. This high incidence of dropout is related to the student's difficulties in adapting to these modalities, which is a result closely associated with the low attention that the university system pays to the needs that first-time students may present in their process of adaptation to university. In this respect, the freedom granted in these modalities is a handicap for those who are not able to acquire the organisation, time management and commitment strategies that predict success, factors that can be reversed with greater attention through tutoring and student support services, currently not very available at the university and underused by students (Cantos et al., 2021).

Pedagogical strategies can contribute to the reduction of the incidence of university dropout by providing the student with additional support during the learning process (Jani, 2022). Within these strategies, models adapted to the characteristics of the students and their preferences can be adopted, giving students the opportunity to participate so that the link they create with their peers encourages synergies between them and thus activates their own learning efficacy. The most frequently mentioned approaches in previous research, to name a few, are peer mentoring, the creation of working groups, the creation of participation channels such as virtual or face-to-face forums or the incorporation of active methodologies (Canty et al., 2020; Frémont and Arnal, 2021; Portal Martínez et al., 2022; Ugwulor-Onyinyechi et al., 2022).

Cohen (2017) study provides evidence for the effectiveness of online activities for student self-assessment and monitoring when students are given feedback on how they can achieve the goals of the subject they are taking. According to this author, the information provided to learners is key for them to be able to fully engage in the tasks they are set, making them aware of how their effort will have a predictable reward that will help them achieve their goal.

In addition, Ugwulor-Onyinyechi et al. (2022) have identified that when pedagogical strategies are implemented using digital resources, they are more effective than face-to-face support, suggesting that there is a significant window of opportunity for the development of these strategies, for two main reasons: the lower cost to the university system of strategies based on digital media and the greater capacity of these to offer flexible and individualised responses for all students, focused on their particular needs.

Jani (2022) research has shown that, given the role of the peer group, the creation of groups that function collaboratively as learning communities plays an important role in student retention, encouraging the synergies that are created between students to support their persistence in the university system. According to this author, when relationships between students are encouraged, students support each other during the learning process, which increases the level of integration of students in the university, which is one of the most influential factors in the decision to continue, an argument that has also been defended by Cantos et al. (2021) and Gutierrez-Aguilar et al. (2021), who justify the building of groups, forums or communities as a way to reinforce perceived support.

Gupta et al. (2020) have recognised the role that educational quality management systems can play in redesigning the didactic and pedagogical approaches that are implemented in the university, as they help to conduct a continuous and targeted audit to understand the role that the strategies that the university implements have on student retention. To increase the explanatory power of surveys, focus groups and other tools used to enhance the monitoring of the learner experience, Gupta et al. (2020) suggest that it is imperative that there is a high level of awareness among educational institutions regarding

student retention, as this will enable a more effective system to be implemented to increase the quality of educational provision. Indeed, a culture of quality needs to be implemented in higher education institutions to help managers and decision-makers understand the important role that student satisfaction during the first academic year plays in ensuring that students continue their studies and remain committed throughout their time at university.

4. Conclusion

Access to higher education is currently at an all-time high as a result of the maximisation of opportunities offered by the education system at all stages, but the number of students completing university shows a very high dropout rate, which requires the adoption of prevention strategies to reverse this complex phenomenon.

Pedagogical strategies can provide avenues of support to keep learners engaged in the learning process. It is essential to establish support routes through tutoring and the creation of virtual or face-to-face meeting points to provide feedback to learners and support the acquisition of knowledge through participation. Today, the education system has a number of tools that it can implement to provide students with flexible support strategies to optimise the assistance perceived by students, which is seen as a dimension of great importance during the first academic year at university. Students' needs for adaptation to the university environment must be satisfactorily met through didactic approaches and pedagogical strategies aimed at facilitating students' understanding of how the degree course they are taking works, making them aware of the interconnection between the teaching-learning actions that are developed and the results they can obtain by proactively participating in them. In addition, students need individualised strategies and the viability of these is today increased through the use of technology, so that the student's commitment to the education they are receiving can be achieved through the use of various mechanisms that reinforce the perception of the support received from the education system.

The adaptation of pedagogical strategies to the characteristics of the student body can increase the capacity of the education system to retain students in higher education, increasing the competitiveness of society as a whole by improving the available human capital. In addition, by inducing student engagement at a higher level through the use of pedagogical strategies, the university system will be able to contribute to the generation of greater well-being among the wider population, given the relationship between educational attainment and the level of income, health and quality of life enjoyed by citizens. Therefore, updating the pedagogical strategies used in universities is not a trivial matter: the capacity of the social system to generate positive outputs in the medium and long term lies in them.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and 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 have participated in the preparation of this manuscript and agree to be responsible for its content prior to publication.

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.

The reviewer JL declared a shared affiliation with the authors to the handling editor at time of review.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2023.1110491/full#supplementary-material

References

Anyanwu, S. U., and Iwuamadi, F. N. (2015). Student-centered teaching and learning in higher education: transition from theory to practice in Nigeria. *International Journal of Education and Research* 3, 349–358.

Bonaldo, L., and Pereira, L. N. (2016). Dropout: demographic profile of Brazilian university students. *Procedia Soc. Behav. Sci.* 228, 138–143. doi: 10.1016/j.sbspro.2016.07.020

Cantos, U. C., Chilan, Y. T., and Zambrano, Á. H. (2021). Traditional pedagogical trends and their impact on the decline in the student population. *International Journal of Social Sciences and Humanities* 5, 243–252. doi: 10.53730/ijssh.v5n3.2024

Canty, A. J., Chase, J., Hingston, M., Greenwood, M., Mainsbridge, C. P., and Skalicky, J. (2020). Addressing student attrition within higher education online programs through a collaborative community of practice. *Journal of Applied Learning & Teaching* 3, 1–12.

Cervero, A., Galve González, C., Blanco, E., Bernardo Gutiérrez, A. B., and Casanova, J. R. (2021). Vivencias iniciales en la universidad:¿ cómo afectan al planteamiento de abandono? *Revista de psicología y educación* 16:161. doi: 10.23923/rpye2021.02.208

Cohen, A. (2017). Analysis of student activity in web-supported courses as a tool for predicting dropout. *Educ. Technol. Res. Dev.* 65, 1285–1304. doi: 10.1007/s11423-017-9524-3

De Castro Lima Baesse, D., Grisolia, A. M., and de Oliveira, A. E. F. (2016). Pedagogical monitoring as a tool to reduce dropout in distance learning in family health. *BMC Med. Educ.* 16, 1–8. doi: 10.1186/s12909-016-0735-9

Fonseca-Grandón, G. R. (2018). Trayectorias de permanencia y abandono de estudios universitarios: una aproximación desde el currículum y otras variables predictoras. *Educación y educadores* 21, 239–256. doi: 10.5294/edu.2018.21.2.4

Frémont, H., and Arnal, F. (2021). To avoid dropout: let students teach! Paper presented In *2021 30th Annual Conference of the European Association for Education in Electrical and Information Engineering (EAEEIE)* 1:5. IEEE.

Godor, B. P. (2017). Academic fatalism: applying Durkheim's fatalistic suicide typology to student drop-out and the climate of higher education. *Interchange* 48, 257–269. doi: 10.1007/s10780-016-9292-8

Gregori, P., Martínez, V., and Moyano-Fernández, J. J. (2018). Basic actions to reduce dropout rates in distance learning. *Eval. Program Plann.* 66, 48–52. doi: 10.1016/j.evalprogplan.2017.10.004

Gupta, S. K., Antony, J., Lacher, F., and Douglas, J. (2020). Lean six sigma for reducing student dropouts in higher education–an exploratory study. *Total Qual. Manag. Bus. Excell.* 31, 178–193. doi: 10.1080/14783363.2017.1422710

Gutierrez-Aguilar, O., Bautista-Lopez, J., Sànchez-Meza, E., Falcon-Huamani, R., Condori-Surco, Y., and Tomaylla-Quispe, Y. (2021). "The virtual teaching process and academic self-efficacy in learning and the intention to drop out university studies in times of Covid-19", *2021 XVI Latin American Conference on Learning Technologies (LACLO)* IEEE, pp. 376.

Jani, V. (2022). Partnerships promote inclusion: a university and a secondary school collaborate to decrease dropout rates and increase college enrollment. *Plan. High. Educ.* 50, 36–46.

Laato, S., Lipponen, E., Salmento, H., Vilppu, H., and Murtonen, M. (2019). Minimizing the number of dropouts in university pedagogy online courses. *CSEDU* 1:587.

Le, H. T. T., Nguyen, H. T. T., La, T. P., Le, T. T. T., Nguyen, N. T., Nguyen, T. P. T., et al. (2020). Factors affecting academic performance of first-year university students: a case of a Vietnamese university. *International Journal of Education and Practice* 8, 221–232. doi: 10.18488/journal.61.2020.82.221.232

Mestan, K. (2016). Why students drop out of the bachelor of arts. *Higher Education Research & Development* 35, 983–996. doi: 10.1080/07294360.2016.1139548

Mtshweni, B. V. (2022). Adjustment and socioeconomic status: how do these factors influence the intention to dropout of university? *S. Afr. J. Psychol.* 52, 262–274. doi: 10.1177/00812463211059141

Perez, B., Castellanos, C., and Correal, D. (2018). "Applying data mining techniques to predict student dropout: a case study", *2018 IEEE 1st colombian conference on applications in computational intelligence (colcaci)* IEEE, pp. 1.

Pierella, M., Peralta, N., and Pozzo, M. (2020). El primer año de la universidad. Condiciones de trabajo docente, modalidades de admisión y abandono estudiantil desde la perspectiva de los profesores. *Revista iberoamericana de educación superior* 11, 68–84. doi: 10.22201/iisue.20072872e.2020.31.706

Portal Martínez, E., Arias Fernández, E., Lirio Castro, J., and Gómez Ramos, J. L. (2022). Fracaso y abandono universitario: percepción de los (as) estudiantes de Educación social de la Universidad de Castilla La Mancha. *Rev. Mex. Investig. Educ.* 27, 289–316.

Respondek, L., Seufert, T., Hamm, J. M., and Nett, U. E. (2020). Linking changes in perceived academic control to university dropout and university grades: a longitudinal approach. *J. Educ. Psychol.* 112, 987–1002. doi: 10.1037/edu0000388

Roberts, S. (2011). Traditional practice for non-traditional students? Examining the role of pedagogy in higher education retention. *J. Furth. High. Educ.* 35, 183–199. doi: 10.1080/0309877X.2010.540320

Solis, M., Moreira, T., Gonzalez, R., Fernandez, T., and Hernandez, M. (2018). "Perspectives to predict dropout in university students with machine learning", *2018 IEEE International Work Conference on Bioinspired Intelligence (IWOBI)* IEEE, pp. 1.

Ugwulor-Onyinyechi, C. C., Tunca, E. A., Anselm, A. U., Anazor, A. E., Odoh, G. C., Gever, V. C., et al. (2022). Impact of visual multimedia as a counselling strategy for reducing school dropout propensity among school children who are survivors of abductions in northern Nigeria. *J. Asian Afr. Stud.* 57, 1401–1413. doi: 10.1177/00219096211058891

Velázquez, N. Y., and González, M. M. A. (2017). "Factores asociados a la permanencia de estudiantes universitarios: caso uamm-uat", *Revista de la educación superior.* 46, 117–138.

Multicausal analysis of the dropout of university students from teacher training studies in Andalusia

Pilar Ibáñez-Cubillas[1]*, Slava López-Rodríguez[2],
Isabel Martínez-Sánchez[3] and José Álvarez Rodríguez[4]

[1]Didactic and School Organization Department, Faculty of Education Sciences, University of Málaga, Málaga, Spain, [2]Didactics of Languages and Literature Department, Faculty of Education and Sports Sciences, University of Granada, Melilla, Spain, [3]Department of Research Methods and Diagnosis in Education I, Faculty of Education, National University of Distance Learning, Madrid, Spain, [4]Pedagogy Department, Faculty of Education, University of Granada, Granada, Spain

To give an answer and a solution to the inconveniences that dropout brings to universities and to society, we have studied the different approaches that exists in the actual scientific literature about the reasons of this phenomenon. The aim of this investigation is analyzing the college dropout, focalizing in students of education degrees of Andalusian universities. For doing that, we applied a standardized instrument that pretend to determine which are the factors associated to the permanence of the college students. The instrument was applied to 608 students of the first year of six Andalusian universities. Of these, 274 were studying Infant education degree and 334 Primary education degree. The study shows that a large sample of the subjects interviewed responded with higher scores 3.83, stating the need to remain in their undergraduate studies, with few references to dropping out of the university. Some of the items that have obtained the highest ratings express their desire to graduate with honors, become a good professional and practice their profession within their field of work, among others.

KEYWORDS

higher education, predictors, dropout, teaching staff, Andalusian universities

1. Introduction

This article comes from the research with reference B-SEJ-516-UGR18 approved in the call for projects I + D + i FEDER Andalucía 2014–20. University dropout has serious consequences at the social and institutional level, but also for the student who quits the university, therefore, the high number of students who drop out remains one of the main problems of university institutions, as well as a concern worldwide. This phenomenon is of great interest because of the need to address its consequences and, although it has been extensively studied, there is a need to broaden the understanding of the context in which it occurs. In this regard, it should be noted that dropout does not behave in the same way in every country, institution, or generation, as the social, cultural, economic, political, or religious factors that shape the reality differ in each context. However, to analyze the phenomenon in a particular context, it is important to take the scientific literature as a reference point, in which the types of drop-out, their causes and consequences, as well as the variables, factors or patterns that indicate the student's decision making, are set out.

University dropout is a diverse and nuanced concept (Behr et al., 2020) but commonly understood in this study as "situations where a student leaves the university study in which (s)he has enrolled before having obtained a formal degree" (Larsen et al., 2013). In this sense, temporary interruption of academic activity or change of degree is excluded. In this sense, it must be understood that the

student enters university with the intention of completing the degree and obtaining a graduate degree, however, different reasons or cases may cause them to drop out. Thus, the factors and determinants involved in dropping out of university studies have led to different theoretical models and multiple classifications. The most prominent and currently widely accepted model is Tinto's (1978, 1998) explanatory model of university dropout, as it stresses the need to take a holistic approach to studying and intervening in university dropout. According to this model, students, upon entering university, interact with the academic and social system, whose level of integration modifies students' initial institutional commitment, goals and intentions, which in turn determines the decision to stay or drop out of university. Therefore, and according to Fernández-Mellizo's classification (2022, p. 9), the factors that explain university dropout are divided into: (a) individual factors, which include demographic (gender, age), socioeconomic (social, economic, cultural situation) and academic factors (previous educational experience and academic expectations); (b) factors of student interaction with the university that result in academic integration, mainly referring to academic performance, and social integration, which refers to the degree of participation and institutional commitment of the student. And finally, (c) institutional factors, referring to the elements that make up the institution itself, such as infrastructures, resources, quality of teaching, etc.

As a result, dropout seems to be the result of a set of interacting variables, since during a long decision-making process, several problems or variables accumulate and drive the student to leave university without a degree. Thus, determining the causes that lead students to drop out is not always easy, nor is their willingness to do so, which is why numerous studies have been conducted to determine the most important causes and variables, as well as their degree of interaction and influence on the final decision (Lizarte, 2017; Vergara et al., 2017; Sosu and Pheunpha, 2019).

First-year students are the most vulnerable and at the highest risk of university dropout, as they have the highest dropout rates (Tinto, 2010; Blair, 2017; Hernández Rosell and Pérez Pérez, 2019; Casanova et al., 2021). During university entrance, some students encounter great difficulties in the process of transition and adaptation to the university context, as they must face academic, social and emotional demands. Thus, during the first year, it is a challenge for students to understand the academic learning process, as they must learn to manage time, develop academic and information literacy skills, learn how to learn or learn to interact appropriately with academic staff (Blair, 2017). This, coupled with the pressure on students to interact with peers to choose the friends with whom they will share academic tasks and spend much of their time at university, as well as having unsatisfactory social and academic experiences during the first year, leads to students' diminished ability to perform and adapt to the university context, which increases the likelihood of dropping out (Hernández Rosell and Pérez Pérez, 2019; Casanova et al., 2021). Therefore, the higher the academic performance and social integration, the less likely the student is to drop out (Tinto, 1978, 1998).

Thus, the absence of support during the transition to higher education, lack of or restricted access to university infrastructure, resources or services, students' difficulties in managing challenges during the first year, academic burnout, being a victim of bullying or cyberbullying, or negative emotional, cognitive and behavioral experiences affect student well-being (Blair, 2017; Wilcox and Nordstokke, 2019; Bernardo et al., 2020; Casanova et al., 2021) and act as predictors of

dropout, while participation in class or institutional groups, positive relationships with teachers and friends, academic satisfaction or satisfaction with the degree they are taking (Cervero et al., 2017; Wilcox and Nordstokke, 2019; Behr et al., 2020; Casanova et al., 2021; Álvarez Ferrándiz et al., 2022) act as elements of institutional persistence. In fact, several authors consider that adaptation and social integration in the university context is an essential variable for predicting university dropout (Blair, 2017; Cervero et al., 2017; Hernández Rosell and Pérez Pérez, 2019; Casanova et al., 2021). Although Portal Martínez et al. (2022) add economic difficulties as a determining factor that currently influences university dropout, as it prevents the financing of study-related expenses. Thus, those students who pay for their studies thanks to scholarships or with the help of their parents are less likely to drop out.

2. Materials and methods

2.1. Some data on dropouts in higher education

Dropping out of higher education is a phenomenon of great relevance at a global level due to the high rates it presents, a reality that can be observed in 180 countries, as stated by the International Association of Universities (Cabrera et al., 2006). For the 2020 cohort, the Organization for Economic Co-operation and Development records an average university dropout rate of 32%. Among OECD countries, the United Kingdom and Switzerland stand out for their low dropout rates, which do not exceed 20%. However, in countries such as Brazil, Colombia and Italy, the university dropout rate is around 50%. In the case of Spain, a total of 28% university dropout rate is recorded (OECD, 2022).

Regarding the European context, the results of some of the studies on dropout in Higher Education are shown below. Thus, the data provided by the Ministry of Education and Vocational Training in 2020 and 2021 show the university dropout rates of each of the countries that make up the European Union. The countries with the highest university dropout rates in 2020 are Spain with 31.8%, followed by Romania with 31.3% and Italy with 26%. However, according to the data for the year 2021, Spain has managed to reduce the university dropout rate by 5.4%, reaching the figure of 26.4%, while Romania and Italy have only reduced the university dropout rate by 0.7% in both cases. On the other hand, the European country with the lowest incidence of dropout in 2020 was Croatia (4.4%) but it moved to second place with 4.8% in 2021, as Ireland (10.1% in 2020) reduced dropout to 4.4% in 2021. Despite the reduction of the dropout rate in some countries, the European Union, in the framework of the Europe 2020 Strategy, has proposed as a strategic objective to reduce the dropout rate among 18–24 years old to below 10% (Ministry of Education and Vational Training, 2020).

As has been shown, the data provided by different institutions/ organizations show very high percentages in the Spanish context, generating concern as these results are above the average of the countries that make up the OECD. In fact, in the data for the year 2021, the figure for university dropout (in young people aged 18 to 24) is 16.7% for men and 9.7% for women, placing Spain in second place in the ranking of all the countries that make up the European Union (EU) with the highest dropout figures after Romania, although, in the year 2020 these figures amounted to 20.2% for men and 11.6% for women, occupying first place in the ranking of the EU [Instituto Nacional de Estadística (INE), 2020].

On the other hand, the latest report of the Ministry of Universities (2022) reveals that the dropout rate of the 2017–2018 cohort of new entrants to higher education (Bachelor's Degree) is 13%, a result obtained by subtracting the 21.3% who dropped out in the first year minus the 8.3% who changed to another degree within the Spanish University System (SUE). However, these figures may lead to a misunderstanding due to certain variables that must be taken into account, for example, whether we are talking only about on-site universities (16.5%) or off-site universities (43.47%); public universities (21.7%) or private universities (19.3%), and even by branch of knowledge, since degrees belonging to the branches of Arts and Humanities (27.5%), Engineering and Architecture (25%) and Sciences (21.7%) have a higher drop-out rate than those belonging to the branches of Social and Legal Sciences (20.3%) and Health Sciences (16.6%) (Ministry of Universities, 2022).

2.2. Drop-out rates in Andalusia and in the teacher training degree at the University of Granada

In terms of dropout rates in Spain, limited to each of the Autonomous Communities, and taking as a reference the on-site and public universities and only the data for both dropouts and degree changes for the 2017–2018 cohort, the Balearic Islands (37.1%) is the community with the highest university dropout rate, followed by Asturias (35%) and the Canary Islands (31.3%). At the opposite extreme is Extremadura with the lowest dropout rate (20.5%), followed by Navarra (23.3%) and Madrid (23.5%) (Ministry of Universities, 2022). To be able to see the evolution of dropout rates in Spain, some data are collected to illustrate the need to continue working on and studying this phenomenon, which causes major problems in public universities and, consequently, in private universities (see Table 1):

Similarly, and taking the variables indicated in the previous paragraph as a reference, the data for the 2017–2018 cohort (aged 18 to 24) show a university dropout rate of 24.6% in Andalusia, placing it in seventh position among the Autonomous Communities with the lowest dropout rate (see Table 1). Since then, the drop-out rate in Andalusia has gradually decreased (21.6% in 2019 and 21.8 in 2020) to reach a figure of 17.7% (Instituto de Estadística y Cartografía de Andalucía, n.d. a, b). In the Andalusian context, in the ranking of the 9 Andalusian public and on-campus universities, the University of Cadiz occupies the first position with the highest drop-out rate (36.3%), followed by the University of Huelva (35%) and the University of Almeria (28.8%). Between fourth and sixth position are the University of Malaga (28.4%), the University of Seville (26.1%) and the University of Jaen (25.5%). Between seventh and eighth position are the University of Cordoba (24.3%) and the University of Granada (22.4%) with lower values, with the University of Pablo de Olavide being the university with the lowest dropout rate (14.2%) (U-Ranking, 2022).

TABLE 1 Partial dropout and change rates in the first year of undergraduate studies by autonomous community and type of university.

	Total		Public universities		Private universities	
	Dropout in the first year of the degree	Change of program in the first year	Dropout in the first year of the degree	Change of program in the first year	Dropout in the first year of the degree	Change of program in the first year
Total	21.3	8.3	21.7	8.8	19.3	6.2
On-site Universities	16.5	8.3	16.9	8.6	14.2	6.6
Andalusia	16.8	7.8	16.8	7.8	19.2	11.9
Aragon	16.2	7.6	16.6	7.8	12.1	5.0
Asturias	23.5	11.5	23.5	11.5		
Balearic island	25.2	11.9	25.2	11.9		
Canary Islands	21.6	9.0	22.2	9.1	6.6	4.3
Cantabria	18.4	9.0	17.8	9.2	20.6	8.0
Castilla la Mancha	18.0	8.9	18.0	8.9		
Castilla y León	16.2	7.5	16.5	8.4	15.1	4.2
Catalonia	16.8	9.0	17.1	9.3	14.8	7.0
Valencia	15.4	7.4	15.9	7.7	12.6	5.5
Extremadura	14.0	6.5	14.0	6.5		
Galicia	18.0	8.3	18.0	8.3		
Madrid	14.8	8.4	14.8	8.7	14.5	7.5
Murcia	18.3	9.5	19.9	11.0	14.7	6.2
Navarra	14.5	7.4	15.3	8	13.9	6.9
Basque Country	14.5	7.4	15.9	8.1	10.8	5.3
La Rioja	18.7	9.1	18,7	9.1		
Non-attendance universities	43.4	8.7	50.3	10.3	29.9	5.4

New entry cohort 2017–2018. Spanish University System Facts and Figures Report. Publications 2021–2022 (Ministry of Universities, 2022).

	Bachelor's degrees in primary education			Bachelor's degrees in early childhood education		
	2018/2019	2019/2020	2020/2021	2018/2019	2019/2020	2020/2021
Granada	11.92%	14.48%	11.76%	7.64%	12%	8.15%
Ceuta	40.68%	44.44%	48.35%	38.64%	31.71%	26.79%
Melilla	25.45%	21.62%	32.14%	24.14%	37.5%	30.77%

Own elaboration based on University of Granada [s/f a (n.d.), s/f b (n.d.), s/f c (n.d.), s/f d (n.d.), s/f e (n.d.), s/f f (n.d.)].

The University of Granada is the second Andalusian university with the lowest dropout rate of 22.4%, which implies a retention rate of 77.6%. The University of Granada offers a total of 77 degrees and double degrees (63 + 14), among which are the degrees in Primary Education and Early Childhood Education offered at the Granada Campus, as well as in the autonomous cities of Ceuta and Melilla. Thus, Table 2 shows the dropout rate of the bachelor's Degrees in Primary and Early Childhood Education taught at the different campuses between 2018 and 2021. The minimum university dropout rate for the bachelor's degree in Primary Education (Granada) is 11.76% in the academic year 2020/2021, although it only varies by 0.16% with respect to the academic year 18/19. On the other hand, the Ceuta campus has the highest dropout rate of almost 50% in the last three academic years, although Melilla also has high values of up to 32.14% in 2020/2021. However, the bachelor's degree in Early Childhood Education (Granada) has the lowest university dropout rates with respect to the campuses where it is taught and compared to the figures for the bachelor's degree in Primary Education, with a figure of 7.64% in the 2018/2019 academic year, although it increases by 0.51% in the 2020/2021 academic year. On the other hand, the Ceuta and Melilla campuses have a high dropout rate with very similar figures for the period between 2018 and 2021.

From a global point of view, Table 2 shows that in the last 3 years both the bachelor's degree in Primary Education and the bachelor's degree in Early Childhood Education taught in Granada have the lowest university dropout rates, while Melilla and Ceuta, specifically, reach very high figures. Finally, it is worth mentioning that the highest dropout rates in both degrees are grouped in academic year 19/20 (except for the Degree in Primary Education in Melilla −21.62%- and Early Childhood Education in Ceuta −31.71%), an academic period that coincides with the COVID19 pandemic.

Consequently, this study carries out a multi-causal analysis of university dropout in Primary Education and Early Childhood Education students from five Andalusian Universities.

2.3. Method

2.3.1. Objectives

The study presented here is part of the research project on academic dropout in Andalusian universities, financed by FEDER funds.

This study aims to determine the causes of academic dropout in early childhood and primary education degrees at Andalusian universities from a predictive and diagnostic perspective of the groups at risk.

2.3.2. Process

The study consisted of applying an instrument to diagnose the risk of dropping out of university studies in Early Childhood Education and

Primary Education to a sample of first-year university students at universities in Andalusia, selecting the University of Granada (UGR, Granada and Ceuta), the University of Jaén (UJA), the University of Pablo de Olavide (UPO), the UCM, and the University of Seville (US). Following Kehm et al. (2019), academic dropout in higher education is most prevalent during the first year, so the research is focused on this moment. The tool was distributed at the beginning of the second semester so that students would have had a preliminary 6-month contact with the degree program, which is essential for them to understand whether their expectations regarding the academic process are realistic, as well as to get to know and integrate socially and academically into the institution.

To recruit participants, the questionnaire was distributed to entire groups of students whose professor showed interest in collaborating with our research. The sampling technique, therefore, consists of the distribution of the research instrument by convenience, akin to the non-probability sampling process.

2.3.3. Instrument

The "Survey on successful student retention" by Velázquez and González (2017), which the authors applied to a population of nursing students at the Unidad Académica Multidisciplinaria Matamoros of the Universidad Autónoma de Tamaulipas, was used to detect subjects at risk of academic dropout.

The instrument has been succinctly adapted to adequate the wording to the Spanish context, excluding two of the 73 items proposed by the authors as they were considered not operative in the context of the exploration. Consequently, the tool applied consisted of a survey made up of 71 items, completed with 6 questions to collect some socio-demographic data on the participants, making a total of 77 items. The items that make up the Velázquez and González (2017) questionnaire present a 5-degree Likert-type scale in which students rank themselves according to their degree of agreement or disagreement with the statement presented to them. In relation to the socio-demographic questions, these are open-ended, although they are subsequently coded under stricter categories for their treatment in the data analysis.

The selection of the Velázquez and González (2017) instrument responds to the interest of the education system in anticipating this phenomenon and acting preventively, articulating actions that have a positive impact on the persistence of students because this instrument makes it possible to determine potential factors that condition academic dropout and, in the light of these, which groups could be at greater risk of suffering from it due to their particular characteristics.

The instrument developed by Velázquez and González (2017), distributes the items around four factors which, in turn, are broken down into 12 categories from which the individual's commitment to their academic project could be interpreted in a positive sense and, from a negative prism, the risk of failure. These factors, associated with their

TABLE 3 Factors and categories of student permanence in the university persistence survey.

Factor	Categories
Motivation	Internal (intrinsic motivation):
	• Personal goals
	• Expectations of success
	• Self-concept
	External (extrinsic motivation):
	• By the instructor in the classroom
Commitment	Personal commitment to study:
	• Self-efficacy Academic performance within the university pathway.
	• Perception of difficulty
	Perceived commitment to the institution:
	Degree quality
	• Academic services
Attitude and behavior	Academic integration:
	• Sense of belonging
	• Relationship with academic authorities
	• Relationship with peers
Socio-economic conditions	• Social and family interaction
	• Economic conditions

TABLE 4 Items with lower scores for early childhood education and primary education qualifications.

	Item	Mean	Deviation
2	My teachers use assessment strategies that encourage my creativity.	2.8311	1.09182
4	My teachers care about my performance.	2.9102	1.16562
7	In general, I feel motivated by my teachers.	2.9300	1.07458
19	I participate actively in class.	3.0062	1.15707
6	I feel that my effort is recognized by my teachers.	3.0639	1.19364
26	I consider my career to have a high degree of difficulty.	3.1862	0.96344
37	My course coordinator takes action to ensure that there are no free hours between classes.	3.2127	1.62078

Own elaboration.

categories, are shown in Table 3 and are as follows: motivation, commitment, attitude and behaviour, and socio-economic conditions. For **Original Research Articles, Clinical Trial Articles**, and **Technology Reports** the introduction should be succinct, with no subheadings. For **Case Reports** the Introduction should include symptoms at presentation, physical exams, and lab results.

3. Results

3.1. Elements of dropout risk

The overall mean score achieved for the whole set of items for the entire sample is 3.83, i.e., the surveyed student population seems to be oriented toward persistence in studies rather than dropping out.

There are only three items that do not reach the mean score of 3.00, which might suggest the existence of a certain level of dissatisfaction with the student's personal situation in the degree program. Table 4 shows the seven items with the lowest scores, emphasizing that six of

these correspond to neurodidactic factors and only the last one is of an organizational nature.

From the opposite point of view to that previously presented, Table 5 shows the items which are related to the student's persistence, i.e., those items in which the highest scores are achieved. These persistence-oriented items refer to the achievement of objectives, the accomplishment of planned tasks and the learner's self-concept. It should be emphasized that the three items with the highest scores are related to the professional dimension.

The results of a regression model to determine the influence of the factors on retention are shown (Table 6). The model measures the interaction on the following items of the instrument:

8. I am interested in getting an outstanding grade in my subjects.

25. If I have difficulty with a subject, I consult additional literature or seek advice to clear up my doubts.

65. I have never interrupted my studies for one semester or more.

66. I have never considered suspending my university studies either temporarily or permanently.

67. I have taken all my subjects as a student assistant within the University.

69. I am up to date with my English language proficiency levels.

70. I have never failed one or more subjects for not complying with the compulsory percentage of attendance.

71. I attend classes regularly and punctually.

From the Model, to measure the factors of belonging, we observe that the multiple correlation coefficient $R = 0.468547\%$ correlation between the regressor variables that make up the model, which is fine as it is not too high (close to 1) and with this a high correlation, increases the problem of multicollinearity, which in this model is discarded. Furthermore, the $R^2 = 0.219$ 22% of total variability explained by the model, similarly the adjusted $R^2 = 0.208$, 21%, finally the standard error of 1.398 (which is the standard deviation of the error scores). Out of a total of 562 observations (Tables 7, 8).

We note that the critical value is Sig. $= 0.00 < 0.05$, which indicates that the proposed model is significant.

Multiple linear model proposed: $Y = 0.475 + 0.206 \times_8 - 0.017 \times_{25} + 0.017 \times_{65} + 0.139 \times_{66} + 0.104 \times_{67} + 0.119 \times_{69} + 0.245 \times_{70} - 0.028 \times_{71}$.

TABLE 5 Items with the highest scores in early childhood education and primary education qualifications.

N°	Item	Mean	Deviation
9	I want to graduate with honors.	4.9131	0.46481
11	Being a good professional is a personal goal	4.8530	0.49273
12	I wish to work in my profession after completing my studies.	4.7701	0.76274
53	I respect the lines of authority within the educational institution.	4.7014	0.64492
67	I have taken all my subjects as a regular student within the university.	4.6974	0.82768
52	I maintain a respectful and cordial relationship with the school authorities (teachers, coordinators, administrative staff, etc.).	4.6653	0.66962
42	My relationship with my family is cordial and respectful.	4.5958	0.80223
61	In my home I have adequate spaces, services, and equipment for schoolwork.	4.5708	0.80741
59	I am a person free of violence.	4.5546	1.12795
10	Finishing my studies on time is fundamental for me.	4.5470	0.85166
51	I am proud of the career I am studying.	4.5469	0.90871
71	I attend classes regularly and punctually.	4.5421	0.79175
55	I have established friendships with some of my classmates.	4.5230	0.91943
32	The library has the bibliographic material I need for my subjects.	4.5160	1.05431
48	I feel morally supported by my family members.	4.5146	0.90701
18	I fulfil the tasks I am given in the different subjects.	4.5087	0.74617

Own elaboration.

TABLE 6 Regression values associated with permanence factors.

Regression statistics	
Multiple correlation coefficient	0.468528958
Coefficient of determination R^2	0.219519385
Adjusted R^2	0.208228526
Standard error	1.398606845
Observations	562

4. Discussion and conclusion

According to studies such as Aina et al. (2021) or Contini and Zotti (2022), the search for mechanisms to induce the reduction of academic dropout in higher education has led the education system to rely on various sciences, such as sociology, statistics, or neuroscience to investigate academic dropout. These disciplines have improved the understanding of the problems faced by students during the university stage to reduce dropout rates (Kehm et al., 2019). In the contemporary context, the university must adopt those criteria and practices that facilitate student engagement in the academic process to foster the acquisition of the skills and competences that society demands (Mendoza et al., 2019).

The research has focused on understanding what factors contribute to predicting academic dropout in Early Childhood and Primary Education majors, taught in Andalusian universities, by conducting a questionnaire adapted from Velázquez and González (2017) on student retention in higher education. The questionnaire allows (at least) a double interpretation, so that it shows which factors are associated with the academic engagement of students in the university stage and those indicators that reveal a situation of risk. From a positive perspective, the factors related to the professional sphere are the most favorably valued in this research, which are related to the expectations that young people associate with their training, their vocation, and their self-concept in the academic sphere. These results are consistent with those of Bardach et al.

(2020), who found in their research that attrition was linked to the information available about the degree and the students' beliefs about it. The greater the coherence between students' expectations and the academic reality they are exposed to when they enter university, the less likely they are to drop out, which may explain the results of this study, which document that future teachers value these dimensions very positively. The characteristics of this university specialization and the profession for which it qualifies are clearly known by most of the students, which improves their commitment to their training, influencing them to adopt adaptive patterns that keep them linked to the university system, which brings them closer to their personal goals, aligned with their vocation.

On the contrary, the results with lower scores, which reveal the existence of a potential risk of dropping out of the educational system, show the influence of neurodidactic factors on academic dropout, and conditioning it. Consequently, strategies that induce a change in these variables could encourage students' commitment to their academic process, contributing to the reversal of the problem identified.

In recent years, the neurodidactic strategies that have been pioneered in higher education have led to a major transformation of the model, directing it towards a more innovative, active paradigm committed to the promotion of a series of competences and skills that are articulated in a more flexible and individualized way. In line with the results of this study, there are several dimensions that can be addressed to contribute to the reduction of university dropout. In particular, the use of assessment strategies in line with student characteristics, the greater orientation of the educational system towards student performance or the use of extrinsic motivation strategies involving teachers are the most urgent actions, given that these three areas coincide with the items with the lowest scores in the research population. Likewise, the implementation of strategies that encourage student participation in the classroom and positive feedback to students so that they can feel recognized are complementary actions that can prevent academic dropout (Costa et al., 2018; Casadiego et al., 2022; Tete et al., 2022). Specifically, research by Casadiego et al. (2022) has revealed that students who were recipients of more participatory teaching processes, such as those based on active methodological approaches,

TABLE 7 Analysis of variance.

Analysis of variance					
	Degrees of freedom	Sum of squares	Mean squares	*F*	Critical value of *F*
Regression	8	304.247,618	38.0309522	19.4422221	0.0000
Residuals	553	1,081.72391	1.95610111		
Total	561	1,385.97153			

TABLE 8 Coefficient of the model.

	Model coefficients					
	Coefficients	Standard error	*t*-statistic	Probability	Lower 95%	Upper 95%
Interception	0.475	0.472	1.007	0.315	−0.452	1.402
8. I am interested in obtaining an outstanding grade in my subjects.	0.206	0.068	3.023	0.003	0.072	0.340
25. If I have difficulty with a subject, I consult additional literature or seek advice to clear up my doubts.	−0.017	0.047	−0.352	0.725	−0.109	0.076
65. I have never interrupted my studies for one semester or more.	0.077	0.052	1.495	0.135	−0.024	0.179
66. I have never considered suspending my university studies either temporarily or permanently.	0.139	0.053	2.637	0.009	0.036	0.243
67. I have taken all my subjects as a student assistant within the University.	0.104	0.079	1.310	0.191	−0.052	0.259
69. I am up to date with the English levels I am required to take.	0.119	0.039	3.089	0.002	0.043	0.195
70. I have never failed one or more subjects because I did not meet the required attendance percentage.	0.245	0.050	4.862	0.000	0.146	0.344
71. I attend classes regularly and punctually.	−0.028	0.085	−0.333	0.739	−0.196	0.139

attended classes more frequently and, on the contrary, those who were trained with more traditional methodologies had higher dropout rates. Therefore, encouraging the adoption of constructive methodologies in the classroom may be a strategy to encourage retention at university. These approaches, in turn, require the adoption of assessment methods that allow the different milestones in which the student participates to be audited, documenting their achievement in a reliable way so that they can perceive the relationship between their effort and their performance (Maluenda et al., 2022).

In relation to these results, Calatayud's (2018) research has highlighted the importance of adapting assessment processes to the individual characteristics of students to ensure a better fit between the way in which they are assessed and the existing assessment needs. For this author, assessment has a social function, and its character is formative and informative, but in no case punitive. Therefore, by eradicating outdated assessment models, which induce students into a stressful situation that makes it difficult for them to reveal their knowledge, a better measurement of their achievements will be achieved and, at the same time, more accurate feedback to them, raising their interest in the learning process. In addition, Kehm et al. (2019) propose the distribution of satisfaction questionnaires that allow for the collection of students' opinions in relation to the academic process in which they have participated, which will make it possible to adapt

educational policies to their recipients, raising the quality of education through integrated systems that pursue continuous improvement.

On the other hand, the study by Alban and Mauricio (2019) suggests that the adoption of peer tutoring systems, as well as other flexible models from which to build more consolidated support networks among students, can increase student satisfaction with the academic process, highlighting the importance of support among individuals to increase adherence to the educational programs they take. In the same vein, Piepenburg and Beckmann (2022) suggest that encouraging affective factors related to learning by encouraging individuals to associate the learning process with positive emotions through interaction with others can amplify their positive perception of education, leading to greater engagement.

Furthermore, the adoption of Information and Communication Technologies (ICT) in the educational system can be perceived as a window of opportunity for the optimization of didactic processes, valuing the options available to improve student adherence and engagement in the pedagogical process (Niyogisubizo et al., 2022). Similarly, technological tools facilitate the improvement of student engagement through positive feedback on student performance, as well as contributing to the early identification of unmet educational needs that can be addressed by the education system. In line with these measures, it may be of interest to create online tutoring programs, which do not require a high investment and

would allow for the referral of those students who need it. On the other hand, Luis et al. (2022) consider that the use of virtual classrooms and ICT applications helps to predict, based on the time spent accessing and using the tools provided, the level of student engagement, which can be the basis for the creation of personalized motivation strategies, such as sending e-mails, reminders, tutoring sessions, etc., thus enabling the education system to increase its retention capacity. Finally, another factor that can contribute to the reduction of dropout can be represented by the provision of more information to prospective students, so that they gain a realistic perspective on the university career they are interested in, the teaching therein and the opportunities it connects to (Bardach et al., 2020).

Finally, we would like to emphasize that in recent years there has been a growing interest and concern in most countries about university dropout, a problem determined by multiple factors such as the social context, the family, the functioning of the system, the attitude of the administration, the work of each teacher and the disposition of the student himself/herself. Taking into account the set of quantitative and qualitative variables analyzed, we can conclude that the main causes to which students attribute their decision to drop out are related to psycho-educational characteristics.

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.

Author contributions

IM-S and JR organized the database. IM-S performed the statistical analysis. PI-C wrote the first draft of the manuscript. PI-C, SL-R, IM-S, and JR wrote sections of the manuscript. SL-R contributed to manuscript revision of the final version. JR read and approved the submitted version. All authors contributed to the article and approved the submitted version.

Funding

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.

Publisher's note

References

Aina, C., Baici, E., Casalone, G., and Pastore, F. (2021). The determinants of university dropout: a review of the socio-economic literature. *Socio-Econ. Planning Sci.* 1, 101–112. doi: 10.1016/j.seps.2021.101102

Alban, M., and Mauricio, D. (2019). Predicting university dropout through data mining: a systematic literature. *Indian J. Sci. Technol.* 12, 1–12. doi: 10.17485/ijst/2019/v12i4/139729

Álvarez Ferrándiz, D., Arias Corona, M., González Castellón, E., and Fernández, C. M. (2022). Neurodidactic factors in the prediction of academic dropout in Andalusian university students: preventive actions based on ICT. *Texto Livre* 15:e40502. doi: 10.35699/1983-3652.2022.40502

Bardach, L., Lüftenegger, M., Oczlon, S., Spiel, C., and Schober, B. (2020). Context-related problems and university students' dropout intentions—the buffering effect of personal best goals. *Eur. J. Psychol. Educ.* 35, 477–493. doi: 10.1007/s10212-019-00433-9

Behr, A., Giese, M., Teguim Kamdjou, H. D., and Theune, K. (2020). Dropping out of university: a literature review. *Rev. Educ.* 8, 614–652. doi: 10.1002/rev3.3202

Bernardo, A. B., Tuero, E., Cervero, A., Dobarro, A., and Galve-González, C. (2020). Bullying and cyberbullying: variables that influence university dropout. *Comunicar. Med. Educ. Res. J.* 28, 63–72. doi: 10.3916/C64-2020-06

Blair, A. (2017). Understanding first-year students' transition to university: a pilot study with implications for student engagement, assessment, and feedback. *Politics* 37, 215–228. doi: 10.1177/0263395716633904

Cabrera, L., Bethencourt, J., Álvarez, P., and González, M. (2006). El problema del abandono en los estudiantes universitarios. *Relieve* 12, 171–203. doi: 10.7203/relieve.12.2.4226

Calatayud, M. A. (2018). Hacia una cultura neurodidáctica de la evaluación: la percepción del alumnado universitario. *Rev. Iberoamer. Educ.* 78, 67–85. doi: 10.35362/rie7813212

Casadiego, R., Sánchez, J. A., Arroyo, F. J., and Argila, A. (2022). Determinants of university student dropout: the case of the Politécnico Grancolombiano. *Int. J. Manag. Educ* 16, 211–234. doi: 10.1504/IJMIE.2022.122622

Casanova, J. R., Gomes, C. M. A., Bernardo, A. B., Núñez, J. C., and Almeida, L. S. (2021). Dimensionality and reliability of a screening instrument for students at-risk of dropping out from higher education. *Stud. Educ. Eval.* 68:100957. doi: 10.1016/j.stueduc.2020.100957

Cervero, A, Bernardo, A, Esteban, M, Tuero, E, and Carbajal, R, & Núñez J.C. (2017). Influencia en el abandono universitario de variables relacionales y sociales. *Rev. Estud. Inv. Psicol. Educ. Extr.* 12, 46–49. doi:10.17979/reipe.2017.0.12.2531

Contini, D., and Zotti, R. (2022). "Do financial conditions play a role in university dropout? New evidence from administrative data" in *Teaching, Research and Academic Careers* (Cham: Springer), 39–70.

Costa, F., Bispo, M. S., and Pereira, R. (2018). Dropout and retention of undergraduate students in management: a study at a Brazilian Federal University. *RAUSP Manag. J.* 53, 74–85. doi: 10.1016/j.rauspm.2017.12.007

Fernández-Mellizo, M. (2022). *Análisis del abandono de los estudiantes de grado en las universidades presenciales en España*. España: Ministerio de Universidades.

Hernández Rosell, Y., and Pérez Pérez, L. (2019). Integración social en estudiantes universitarios de primer año. *Int. J. Dev. Educ. Psychol.* 3, 57–64. doi: 10.17060/ijodaep.2019.n1.v3.1450

Instituto de Estadística y Cartografía de Andalucía (s/f a). (n.d.). Sistema de indicadores Europa 2020 para Andalucía. Abandono escolar temprano por sexo. Available at: https://www.juntadeandalucia.es/institutodeestadisticaycartografia/badea/operaciones/consulta/anual/68089?CodOper=b3_1854&codConsulta=68089

Instituto de Estadística y Cartografía de Andalucía (s/f b). (n.d.). Sistema de indicadores de Desarrollo Sostenible de Andalucía para la Agenda 2030. Abandono escolar temprano por sexo. Available at: https://www.juntadeandalucia.es/institutodeestadisticaycartografia/ods/evolutivos-4.htm?ind=4-x-x-1-3

Instituto Nacional de Estadística (INE) (2020). Abandono temprano de la educación-formación. Available at: https://www.ine.es/ss/Satellite?L=es_ES&c=INESeccion_C&cid=1259925480602&p=1254735110672&pagename=ProductosYServicios%2FPYSLayout#:~:text=En%20el%20a%C3%B1o%202020%20la,27%20(11%2C8%25)

Kehm, B. M., Larsen, M. R., and Sommersel, H. B. (2019). Student dropout from universities in Europe: a review of empirical literature. *Hungarian Educ. Res. J.* 9, 147–164. doi: 10.1556/063.9.2019.1.18

Larsen, M. R., Sommersel, H. B., and Larsen, M. S. (2013). *Evidence on Dropout Phenomena at Universities*. Copenhagen: Danish Clearinghouse for Educational Research.

Lizarte, E. (2017). Análisis del abandono de los estudios en la Universidad de Granada. El caso de la Facultad de Ciencias de la Educación. Dissertation/master's thesis. Granada: University of Granada.

Luis, R. M., Llamas-Nistal, M., and Iglesias, M. J. F. (2022). On the introduction of intelligent alerting systems to reduce e-learning dropout: a case study. *Smart Learn. Environ.* 9, 1–18. doi: 10.1186/s40561-022-00210-0

Maluenda, J., Infante, V., Galve, C., Flores, G., and Berríos, J. (2022). Early and dynamic socio-academic variables related to dropout intention: a predictive model made during the pandemic. *Sustainability* 14:831. doi: 10.3390/su14020831

Mendoza, E. Y., Murillo, G., and Morales, A. (2019). La enseñanza-aprendizaje en la educación superior: aportaciones desde neurodidáctica. *Didasc@lia: Didac. Educ.* 10, 21–36.

Ministry of Education and Vational Training. (2020). Los objetivos europeos ET 2020 - Education and Training Monitor - Vol I. Available at: http://blog.intef.es/inee/2020/11/12/los-objetivos-europeos-et-2020-education-and-training-monitor-volumen-i/

Ministerio de Universidades (2022). Datos y cifras del sistema universitario español. Publicación 2021–2022. Available at: https://www.universidades.gob.es/stfls/universidades/Estadisticas/ficheros/DyC_2021_22.pdf

Niyogisubizo, J., Liao, L., Nziyumva, E., Murwanashyaka, E., and Nshimyumukiza, P. C. (2022). Predicting student's dropout in university classes using two-layer ensemble machine learning approach: a novel stacked generalization. *Comput Educ: Artif. Intellig.* 3, 100066–100166. doi: 10.1016/j.caeai.2022.100066

OECD. (2022). Education at a glance 2022. OECD Indicators. Available at: https://www.oecd-ilibrary.org/sites/3197152b-en/index.html?itemId=/content/publication/3197152b-en

Piepenburg, J. G., and Beckmann, J. (2022). The relevance of social and academic integration for students' dropout decisions. Evidence from a factorial survey in Germany. *Eur. J. High. Educ.* 12, 255–276. doi: 10.1080/21568235.2021.1930089

Portal Martínez, E., Arias Fernández, E., Lirio Castro, J., and Gómez Ramos, J. L. (2022). Fracaso y abandono universitario: percepción de los (as) estudiantes de Educación social de la Universidad de Castilla La Mancha. *Rev. Mex. Inv. Educ.* 27, 289–316.

Sosu, E. M., and Pheunpha, P. (2019). Trajectory of university dropout: investigating the cumulative effect of academic vulnerability and proximity to family support. *Front. Educ.* 4, 1–10. doi: 10.3389/feduc.2019.00006

Tete, M. F., Sousa, M. M., Santana, T. S., and Fellipe, S. (2022). Predictive models for higher education dropout: a systematic literature review. *Edu Policy Analy. Arch.* 30, 149–159. doi: 10.14507/epaa.30.6845

Tinto, V. (1978). Dropout from higher education: a theoretical synthesis of recent research. *Rev. Educ. Res.* 45, 89–125. doi: 10.3102/00346543045001089

Tinto, V. (1998). Colleges as communities: taking research on student persistence seriously. *Rev. High. Educ.* 21, 167–177.

Tinto, V. (2010). "From theory to action: exploring the institutional conditions for student retention" in *Higher Education: Handbook of Theory and Research*. ed. J. Smart (Dordrecht: Springer), 51–89.

Universidad de Granada (s/f a). (n.d.). Grado en Educación Primaria (Granada). Indicadores e informes de satisfacción del Título de Grado. Available at: https://grados.ugr.es/primaria/static/CMSRemoteManagement/*/vic_cal/_dir_remotos/base_grado/_list_/indicadores

Universidad de Granada (s/f b). (n.d.). Grado en Educación Primaria (Ceuta). Indicadores e informes de satisfacción del Título de Grado. Available at: https://grados.ugr.es/primaria_ceuta/static/CMSRemoteManagement/*/vic_cal/_dir_remotos/base_grado/_list_/indicadores

Universidad de Granada (s/f c). (n.d.). Grado en Educación Primaria (Melilla). Indicadores e informes de satisfacción del Título de Grado. Available at: https://grados.ugr.es/primaria_melilla/static/CMSRemoteManagement/*/vic_cal/_dir_remotos/base_grado/_list_/indicadores

Universidad de Granada (s/f d). (n.d.). Grado en Educación Infantil (Granada). Indicadores del Título de Grado. Available at: https://grados.ugr.es/infantil/static/CMSRemoteManagement/*/vic_cal/_dir_remotos/base_grado/_list_/indicadores

Universidad de Granada (s/f e). (n.d.). Grado en Educación Infantil (Ceuta). Indicadores del Título de Grado. Available at: https://grados.ugr.es/infantil_ceuta/static/CMSRemoteManagement/*/vic_cal/_dir_remotos/base_grado/_list_/indicadores

Universidad de Granada (s/f f). (n.d.). *Grado en Educación Infantil (Melilla)*. Indicadores del Título de Grado. Available at: https://grados.ugr.es/infantil_melilla/static/CMSRemoteManagement/*/vic_cal/_dir_remotos/base_grado/_list_/indicadores

U-Ranking (2022). Datos U-Ranking por Universidad. Universidad de Granada. Available at: https://www.u-ranking.es/universidad/UGR

Velázquez, Y., and González, M. A. (2017). Factores asociados a la permanencia de estudiantes universitarios: caso UAMM-UAT. *Rev. Educ. Sup.* 46, 117–138. doi: 10.1016/j.resu.2017.11.003

Vergara, J. R., Boj, E., Barriga, O. A., and Díaz-Larenas, C. (2017). Explanatory factors the student teachers drop-out rates. *Rev Compl Educ.* 28, 609–630. doi: 10.5209/rev_RCED.2017.v28.n2.50009

Wilcox, G., and Nordstokke, D. (2019). Predictors of university student satisfaction with life, academic self-efficacy, and achievement in the first year. *Can. J. High. Educ.* 49, 104–124. doi: 10.47678/cjhe.v49i1.188230

Check for updates

Causes of academic dropout in higher education in Andalusia and proposals for its prevention at university: A systematic review

Juan-Carlos de la Cruz-Campos[1]*,
Juan-José Victoria-Maldonado[2],
José-Antonio Martínez-Domingo[2] and
María-Natalia Campos-Soto[2]

[1]Department of Didactics and School Organization, Faculty of Education and Sport Sciences of Melilla, University Campus of Melilla, University of Granada, Melilla, Spain, [2]Department of Didactics and School Organization, Faculty of Education Sciences, University Campus of Cartuja, University of Granada, Granada, Spain

Introduction: One of the main problems facing the university system is the high student dropout rate due to a number of variables, accentuated by the COVID-19 pandemic. This is a problem not only in Spanish universities but is prevalent worldwide. It is therefore important to understand and analyze the underlying reasons for dropout so that it can be addressed and mechanisms implemented to limit dropout in higher education to the greatest extent possible.

Method: A systematic review was carried out summarizing the results of studies and reports on university dropout in Spain and specifically in the universities of the Autonomous Community of Andalusia. The review was conducted in accordance with the PRISMA statement by searching the scientific databases Scopus and Web of Science, limiting the search to articles published between 2010 and 2022.

Results: The main publications in both Spain and the Autonomous Community of Andalusia were identified. The review included the main causes of university dropout indicated in each of the selected studies and the proposals to reduce it, including educational policies, the rise of distance education, academic failure in basic educational stages, and social, personal, psychological, and economic variables.

Conclusion: There is a lack of research on university dropout, with only 25% of Spanish universities having carried out research on this subject in the last 12 years. The studies analyzed conclude that the most frequent causes of university dropout are associated with low academic performance, poor social support in the new academic environment, low socio-economic status, pessimism, and lack of motivation, together with other less significant factors such as poor relationships with teachers, lack of vocation, work incompatibility, and previous academic performance. Further research on the causes of university dropout and its prevention is needed both before university entrance, by providing meaningful information to secondary school students, and during the university stay, through

institutional and teaching policies that improve family support and social roots, produce positive academic experiences, favor associationism, and encourage activities that improve planning and time management, together with cognitive learning strategies, motivational strategies and the use of advanced learning materials [such as Information and Communication Technology (ICT) tools].

1. Introduction

The university is considered the preeminent institution for higher education, producing students with the highest level of initial training in a population. It is consequently an institution of great importance with regard to the educational strategies proposed by the government.

Due to the importance of universities as institutions, different parameters are often reviewed in an attempt to control their development by assessing factors including the quality of the education provided, the students and the performance of teachers. Among the most significant pieces of data are the number of students who drop out or leave university studies and the reasons that lead students to dropout (Fernández-Mellizo, 2022).

This is a global problem that impacts Spain in particular as, according to Fernández-Mellizo (2022), 20% of students who start a degree program are affected. On the other hand, Álvarez (2021), notes that according to the National Institute of Statistics, the level of dropout in Spanish universities is decreasing every year, standing at 20.2% for men and 11.6% for women in 2020. In Andalusia, the average is slightly better than the Spanish average. Nevertheless, the percentage of students who drop out of university studies is still above 15%, with 27.5% dropping out of the degree they are pursuing, and 12.1% changing degree program (Ministerio de Universidades, 2021).

In recent times, the scientific literature has been focusing on school dropout at university level, mainly due to the low academic performance of students (Cerezo et al., 2015; Casanova et al., 2018). Furthermore, to avoid an increase in dropout rates, family support is important, and if this is not the case, educational institutions should strengthen students' motivation for education (Sosu and Pheunpha, 2019). Also, some factors linked to school dropout are those nuanced in the study by Troelsen and Laursen (2014) who indicate how culture and economics affect education and school dropout.

In this line, there are several studies, which focus on the influence of the COVID-19 pandemic on education and mainly on school dropout, which may affect the continuation of schooling and learning during and after the pandemic period (Joulaei and Kalateh-Sadati, 2020; Pertegal-Felices et al., 2022).

Similarly, the study carried out by Gómez-García et al. (2022) indicates that the outbreak of COVID-19 has influenced the mental health of university students, being this a factor that has been related to a decrease in their academic performance

and given that the mental health of students is related to their academic performance, they determine that it has influenced an increase in university dropout, being necessary that the academic institutions themselves face measures that try to mitigate this negative influence.

2. Theoretical framework

The European Union is trying to develop new plans to engage its population to attend higher education, having as one of the main goals that the European Commission established in 2020 was that at least 40% of the population between 30 and 34 get a tertiary qualification (European Commission et al., 2015).

That situation has made a change all over the countries that are part of the European Union and, in the last 30 years, governments from around 180 countries have developed different actions to prevent the school dropout more precisely in higher education and working on different aspects concerning socio economic facts.

In that context, the university is considered the preeminent institution for higher education, producing students with the highest level of initial training in a population. It is consequently an institution of great importance with regard to the educational strategies proposed by the governments.

Furthermore, it is a bigger issue as the promotion of higher education is working, the percentage of the 20- to 24-year-olds are increasing in most of Europe. Focusing on the Spanish context, that percentage has increased from 29 to 43% according to the OECD (2017 data cited on Aina et al., 2018).

The University as an institution is complex to understand due to its multiple characteristics and its evolution over time. It was initially conceived as a center for the advancement of knowledge, where teaching and learning processes take place. With the passage of time, it became a research center seeking evidence-based knowledge, with a clear methodology, and its subsequent dissemination (Ruiz-Corbella and López-Gómez, 2019).

From this definition, the University is an essential institution supporting the progress of society. Accordingly, several values are used to define different parameters to evaluate the quality of these institutions. To this end, student grades, failure rates or the university dropout rate are considered (Clavijo-Cáceres and Balaguera-Rodríguez, 2020). One of the most important pieces of information when assessing the educational capacity of universities is the student dropout rate, as it provides a meaningful indication of

the number of higher education students who proceed to complete their education (Fernández-Mellizo, 2022).

School dropout is an issue that has been worked on by different institutions due to the significant economic importance it has for countries. Among these institutions we can highlight the Organization for Economic Co-operation and Development (OECD) and the World Bank (Acevedo, 2020). This is a global problem that impacts Spain in particular as, according to Fernández-Mellizo (2022), 20% of students who start a degree program are affected. Based on Eurostat's (2018) over 3 million young people in the European Union have started a tertiary qualification but they had discontinued their studies because of different facts.

University dropout is not easily explained since it depends on multiple variables and the relationships among them. The university, the faculty and the students, collectively, are the three agents highlighted in this process, providing many models that describe the institution:

1. Integrating Model: Based on the notion that each student pursues his or her own interests and that the relationship he or she has with the university is merely for professional training with a view to obtaining a future benefit. Consequently, the university and its faculty must work to become more student-centered by addressing their needs.
2. Psychopedagogical model: Focuses on the characteristics of the teaching staff. It is proposed as a possible explanation for university dropout because it is understood that the characteristics of the teacher and the methodology used are factors that have an impact on the way the university evolves.
3. Academic Organization Model: Describes how both material and human resources are managed in order to achieve the objectives established by the institution.
4. Economistic Model: Defines the success or failure of students according to the capacities of the students themselves and the resources made available to them by the universities (Cabrera et al., 2006).

These new perceptions of the university are based on a change of paradigm. Initially, the university was conceived as an elitist institution for those who had the financial resources and sought to advance their intellectual development. Accessibility to the university, as well as the diversity of the population that attends it, entails a change in the way the university is viewed as well as the work that should be carried out in it (Portal et al., 2022). Eurostat's (2018), showed that the main reason to drop out of university is the desire to start working, followed by lack of interest in the chosen studies and their difficulty. Other point of view is showed up on the Spanish situation where although some studies cannot prove there is a relationship between the difficulty or the low academic performance (Roso-Bas et al., 2016).

This implies that university failure or dropout does not correspond to a single factor that explains all situations. University failure is a result of adaptation to the context, since the university is not an institution that focuses on the ability to learn but rather on the ability to seek and generate new knowledge, giving great importance to student autonomy. Thus, students with a more neutral character are more likely to have good results, as they do

not require that personal connection with their teachers (Noriega and Arjona, 2011). Consequently, some of the definitions of school failure that have been put forward are obsolete in part or in their entirety.

School failure has been defined as "the situation in which the subject fails to achieve the normal goals for the degree of intelligence he/she possesses in such a way that his/her whole personality is compromised and altered, affecting his/her overall performance as a person and his/her healthy and effective adaptation to the type of life that surrounds him/her" (Ríos, 1973 cited in Pompa et al., 2003, p.82). This definition is noteworthy because it does not present the intellectual capacity of the student as a limitation but as an element that establishes the expected and the result obtained. However, the same definition speaks of the influence that failure has on the individual's personality and also of how the student's environment can be one of the causes leading to it.

Other definitions reduce school failure to the achievement of the objectives set "If the school context is adopted as a reference for school failure, it would be defined as the student's inability to meet the objectives proposed, explicitly or not, by the school (Lara-García et al., 2014, p.72)." From this perspective, failure is seen as not achieving what is expected, but it does not consider that there are internal or external elements that influence this situation.

If the concept of the University and the definitions of failure have varied, what has changed the most are the factors that explain school failure, according to the results presented in Alonso and Lobato (2005), which can be classified as follows in Table 1.

Other authors have added further causes that arise from the interaction of the three main agents, including demotivation for the course, lack of prior knowledge and inadequate use of social networks. Teachers indicate the lack of feedback on activities and inappropriate methods. Finally, the institutions identify the facilities and their organization as one of the main complaints, as well as the lack of more meaningful learning opportunities (Torres et al., 2021).

In addition to these three agents directly involved in the teaching-learning process, the family is another agent implicated in the education of students. Earlier, the potential affective problems of students were mentioned as a limiting factor in achieving the expected grades. However, these problems are not necessarily due to the family and may derive from an adaptation problem. On the other hand, Martínez and Molina Derteano (2019) compare the economic evolution in Spain and Argentina and how this has affected the academic level of students in these countries. They show that families that are better able to support themselves

TABLE 1 Summary of factors contributing to failure at university.

	Internal	External
Students	-Low amount of reading. -Amount of study hours. -Study strategies.	-Hours of compulsory work. -Affective problems.
Teachers	-Relationship with teachers.	
Institution	-Lack of psychological educational support resources for students.	

Source: Own elaboration based on data from Alonso and Lobato (2005).

economically in the face of crises have a greater capacity to acquire education, thus demonstrating how family factors are also influential in terms of school failure.

These factors are important issues to address since they ultimately affect a large percentage of students. This percentage varies depending on the country, the community, the university, the branch of knowledge and even the degree studied. The data range between 15 and 30% of the student body (Álvarez, 2021; Ministerio de Universidades, 2021; Fernández-Mellizo, 2022), affecting between 51,766 and 103,532 of students in Spain for the academic year 2021–2022.

In Andalusia, in particular, although many students are at risk of social exclusion or have grown up in disadvantaged socio-economic situations (Real, 2011), this conflictive context has prompted teachers in the community to devise new ways of teaching their classes thus remedying these negative social aspects.

Prior to university entrance, the Programme for International Student Assessment (PISA) helps to systematically assess what young people know and are able to do at the end of their compulsory secondary education (ESO). The PISA reports detect how low scores on these tests lead to a higher dropout rate, with Andalusia being the only exception (García, 2009). This result is maintained throughout the university period, as Andalusia is one of the Autonomous Communities with an average dropout rate below the Spanish average.

Regarding university failure, Andalusia presents certain particularities. Some studies indicate that dropout is related to the socio-economic profile of the population, per capita income and unemployment rate (López-Martínez et al., 2016), with Andalusia being a community that leads these figures. However, dropout does not occur with the expected frequency (Cervero et al., 2017), which raises the question of whether social factors are really as influential as the characteristics of students, teachers and the institutions themselves in this community.

Based on the scientific literature consulted for this study, the aim is to analyze the research addressing academic dropout in higher education in Spain, subsequently focusing on Andalusia, in order to determine the causes of this situation and to provide proposals for its prevention at university level.

The research questions derived from the main objective and which guide this research are the following:

RQ1: How many studies have been published since 2010 on academic dropout in higher education in Spain and in Andalusia?

RQ2: Which institutions have undertaken research on dropout in higher education?

RQ3: In which fields of knowledge are the studies on this subject framed?

RQ4: What are the causes of academic dropout in higher education in Spain and, specifically, in Andalusia?

RQ5: What proposals can be considered to alleviate this situation?

3. Methodology

3.1. Design and protocol

Based on the nature of the study and to answer the research objective and questions, a systematic literature review methodology was used (Sánchez-Meca, 2010; García-Peñalvo, 2019). To ensure thoroughness and meet certain quality criteria, the review was conducted in two stages: an initial planning stage and an action stage. In the first stage, the objectives and research questions were defined, the search equation (Tables 3, 4) and the databases to be consulted were determined, the inclusion and exclusion criteria were established (Table 2) and the flow chart was designed (Figure 1). In the action stage, the literature was surveyed, the results obtained were refined and the most relevant information was extracted and represented (Romero-Rodríguez et al., 2020). The quality standards of the PRISMA statement (Moher et al., 2009) were also considered: the description of the eligibility criteria, sources of information and search and the process of study selection, data extraction and synthesis of the results are included.

TABLE 2 Inclusion and exclusion criteria.

Inclusion criteria (IN)	Exclusion criteria (EX)
IN1: Journal articles	EX1: Non-peer-reviewed papers
IN2: Articles published from 2010 onward	EX2: Publications prior to 2010
IN3: Studies conducted in the field of higher education	EX3: Studies related to other educational stages
IN4: Studies on early school leavers in Spain	EX4: Studies on early school leavers in other countries other than Spain

Source: Own elaboration.

TABLE 3 Inclusion and exclusion criteria according to patient, intervention, comparison, and outcome (PICO) approach.

	Inclusion criteria	Exclusion criteria
Population	Students from higher education.	Students from educational stages other than higher education, such as pre-school, primary, and secondary education.
Intervention	Studies on school dropout in Spain	Studies on school dropout in other countries other than Spain
Comparator	Not applicable	Not applicable
Outcome	Results that provide the causes of dropout in Spain.	Results that do not specify the causes of academic dropout in Spain. Results that specify the causes of academic dropout in countries other than Spain.

Source: Own elaboration.

TABLE 4   Search strategy in the Web of Science database.

Database	Search descriptors
Web of science (Topic)	Academic AND
	Dropout AND
	Higher AND
	Education AND
	Causes
Type of document	Article
Time period	Since 2010

Source: Own elaboration.

3.2. Eligibility criteria

The search equation was formulated on the basis of the key concepts guiding the study: "dropout" and "higher education." In order to limit the number of results (1,487) the construct "causes" was included as a descriptor. The terms were translated into English, finally establishing the equation: Academic AND dropout AND higher AND education AND causes.

The search was conducted in the Web of Science (WoS) and Scopus databases, as these databases respond to the impact indexes [Journal Citation Reports (JCR) and Scimago Journal & Country

Rank (SJR)] and the indexing of scientific articles in peer-reviewed journals that have undergone a rigorous process for inclusion in WoS and Scopus (Hinojo-Lucena et al., 2019). Inclusion and exclusion criteria can be found in Tables 2, 3, in the latter according to the patient, intervention, comparison, and outcome (PICO) approach (Higgins et al., 2019).

3.3. Review process and establishment of the sample

As mentioned above, the search strategy was carried out in two important databases: WoS and Scopus, considering the quality of the articles indexed in them and their broad scope. After selecting the descriptors that best defined the object of this study and indexing them in Eric's thesaurus, to ensure that they coincided with the keywords most commonly used in scientific language, we proceeded to perform different search equations (Tables 4, 5).

3.4. Data collection and analysis

At the end of October 2022, a search of scientific literature was carried out in two databases (Scopus and WoS). The search
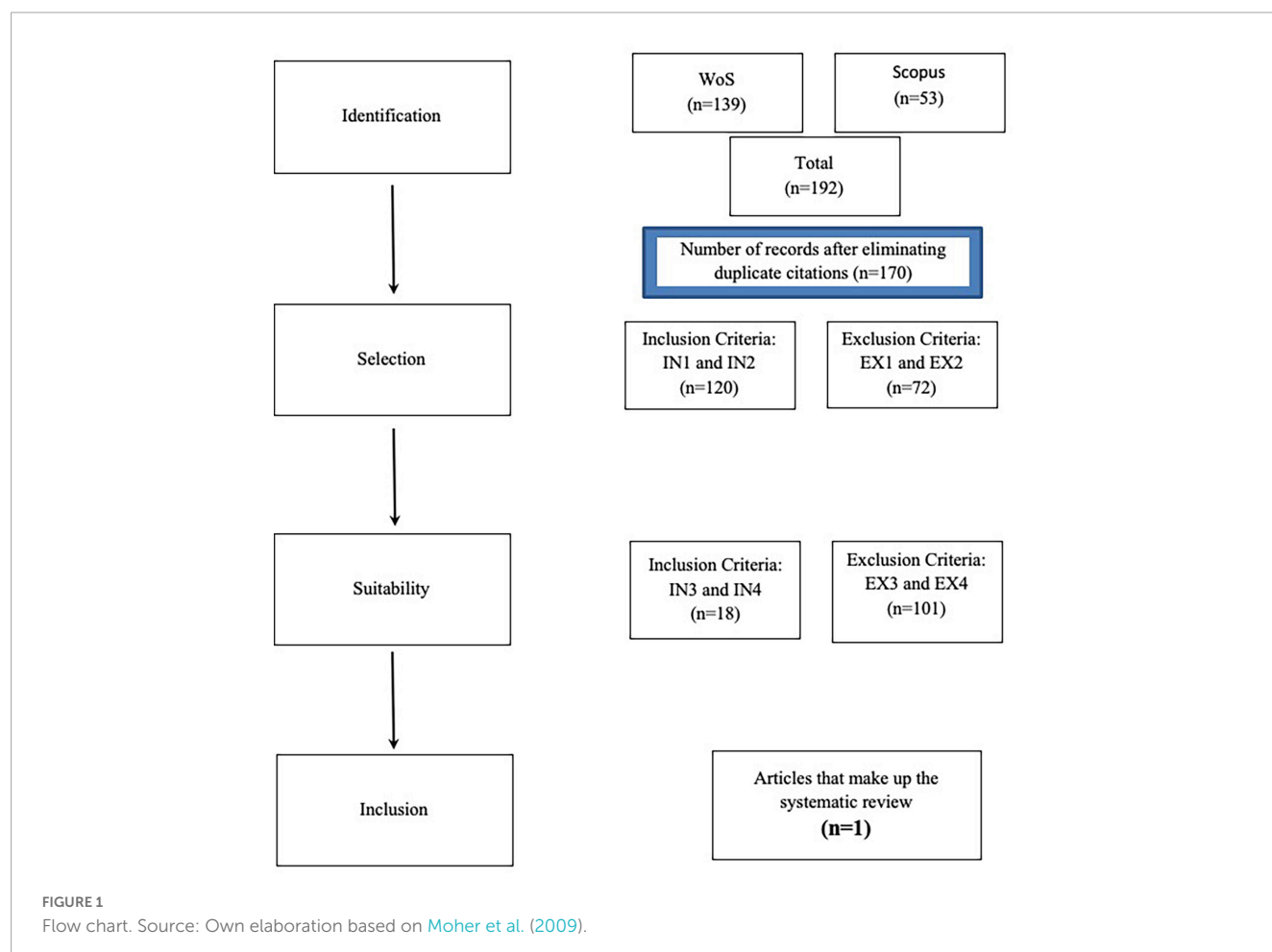

FIGURE 1
Flow chart. Source: Own elaboration based on Moher et al. (2009).

TABLE 5 Scopus database search strategy.

Database	Search descriptors
Scopus (Article title, abstract, and keywords)	Academic AND
	Dropout AND
	Higher AND
	Education AND
	Causes
Type of document	Article
Time period	Since 2010

Source: Own elaboration.

in WoS was not restricted to any specific field since, subsequently, we specified the area to which each article belonged and checked which were the most prolific. The keywords were checked to ensure that they appeared in the title, in the abstract or in the keywords of each article.

Two authors (JJVM and MNCS) conducted separate searches, reviewed the titles, abstracts and keywords of the articles to select those that met the inclusion criteria. Subsequently, duplicate articles were discarded and all selected papers were read in full. A third author (JCdlCC) performed Cohen's Kappa (Cohen, 1988) to measure the concordance between evaluators, obtaining the value Kappa = 0.70; in addition, he verified that the inclusion and exclusion criteria had been faithfully followed in the article selection process.

To verify the inclusion requirements, Microsoft Excel *ad hoc* (Microsoft Corporation, Redmond, WA, USA) was used following the premises of the data extraction template of the Cochrane Consumers and Communication Review Group (2016). The authors (MNCS and JAMD) performed this work separately, clarifying in the discussion the results obtained by each and recording the articles and the reasons for exclusion. The tables and graphs present throughout the document, to facilitate understanding of the results, have been edited using Microsoft Word.

Data collection followed the PRISMA statement, dividing the discrimination process into four stages (Figure 1): an initial identification stage, which contained all the articles found in the databases analyzed by applying the search equation in the two previous tables (Tables 4, 5), a second selection stage, in which duplicate references and those matching the exclusion criteria (EX1 and EX2) indicated in Table 2 were eliminated, a third suitability stage, in which the documents were analyzed to extract those that responded to the research objectives and questions and those that met the inclusion criteria (IN3) discarding the rest (EX3), and fourth, in the inclusion stage, the articles that made up the sample for this research were collected. This search was carried out at the end of October 2022, including all articles indexed in the WoS and Scopus databases from 2010 onward.

Statistical Package for the Social Sciences (SPSS) statistical software version 27 was used for data analysis. The tables and figures presented were edited in Microsoft Word to facilitate the understanding of the results.

4. Results

4.1. RQ1: How many studies have been published since 2010 on academic dropout in higher education in Spain and in Andalusia?

A total of 192 papers have been published related to the topic in question, 53 in Scopus and 139 in WoS. After removing duplicate citations, the number of records was 170, as 22 papers were published in both databases. Applying the inclusion criteria IN1 (Journal articles) and IN2 (Articles published from 2010 onward) we found that 120 articles were published from 2010 onward.

Of the 53 documents indexed in the Scopus database, 34 are Articles, 11 are Conference Papers, four are Book Chapters, three are Reviews and one is a Letter. After applying the exclusion and inclusion criteria to the papers and obtaining 31 articles, it can be seen that one article was published in each year in 2011, 2013, 2014, 2016, and 2017. Two articles were published in 2015, three in 2018, four in 2022, five in 2019, six in 2020, and six in 2021. The highest percentage was published in 2020 and 2021, 38.77% of the total (six articles each year), decreasing to 12.90% in the current year (four articles) (Figure 2). Prior to 2010, four articles were published: in 1985, 2004, 2005, and 2008.

In the WoS database, 139 documents are indexed. Of these, 116 are articles, 20 are meetings and three are review articles. After applying the exclusion and inclusion criteria to the documents and obtaining 108 articles, it can be seen that two correspond to 2010; four to 2011; three to 2012; four to 2013; five to 2014; six to 2015; 12 each to 2016, 2017, 2018, and 2021; 14 to 2019, 13 to 2020 and nine to 2022. In 2019, the highest percentage was published, 12.96% of the total (14 articles), followed by 2020 with 12.03% (13 articles) decreasing in the following years to nine articles in 2022 (Figure 2). Before 2010, eight articles were published in total, corresponding to the years: 2008, 2007, 2005, 1999, 1994, 1993, 1981, and 1965.

This systematic review comprises a total of 18 articles that met the objectives and inclusion criteria of this research. Three correspond to research carried out in Andalusia: two at the University of Granada and one at the University of Seville.

4.2. RQ2: Which institutions have undertaken research on academic dropout in higher education? RQ3: In which fields of knowledge are the studies on this subject framed? RQ4: What are the causes of academic dropout in higher education in Spain and, specifically, in Andalusia?

This section presents the 18 articles included in this systematic review (Table 6, in which we have specified: reference, university, field of research and causes). As can be seen, the first 13 articles correspond to universities across Spain (Figure 3), in general, and the last four to universities in Andalusia (Figure 4), specifically,
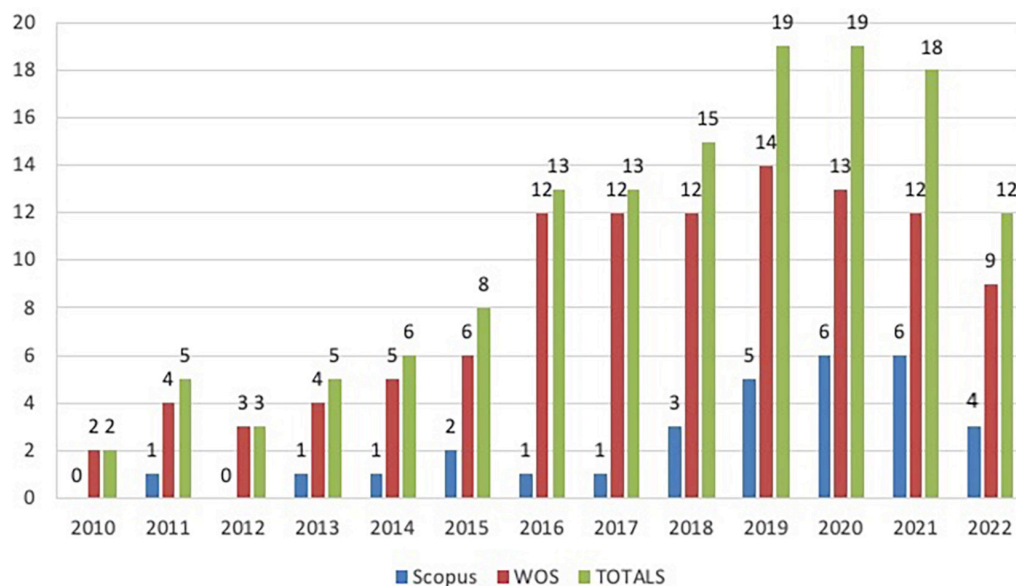
Articles published in the last 12 years in Scopus and Web of Science on the causes of academic dropout in higher education in Spain. Source: Own elaboration.

four are research works carried out by the University of Granada and one by the University of Seville.

Figure 3 shows that the main cause of academic dropout in Spain is academic performance, followed by social support, socio-economic status, lack of motivation and negative relationships with teachers, which contrast with the causes of academic dropout in Andalusia, which are low academic performance, COVID-19, learning methodologies and demographic characteristics. This significant presence of COVID-19 as a factor of academic dropout in Andalusia may be due to the fact that the research carried out in this Autonomous Community was conducted during or just after the pandemic while most of the Spain studies were conducted prior to the pandemic.

4.3. RQ5: What proposals can be considered to alleviate this situation?

Three articles were found on proposals for the prevention of academic dropout in higher education, two from the University of Granada and one from the Autonomous University of Barcelona (Tables 6, 7).

5. Discussion

The Spanish University System in the academic year 2020–2021 was composed of 84 universities: 50 public and 34 privates. Of these, 21 (25%) have published studies related to academic dropout and are included in this review, with the University of Oviedo, the University of La Laguna, the University of Alcalá de Henares and the University of Granada standing out for their scientific production with between two and three published works. This low

production rate may indicate that the problem of academic dropout seems not to have required the research attention of most Spanish universities, despite the fact that this problem affected 21.3% of first-year students in the academic year 2021–2022 (Ministerio de Universidades, 2022). This is the highest rate in Western countries. In the United States, the drop-out rate at the beginning of the second year is 6.2%, although more than 30% of US students do not obtain their degree 3 years after the legal duration of studies. In Finland the drop-out rate is 7.9 and 8.1% in the UK. The Spanish rate is only similar to that of the French-speaking Community of Belgium (21.1%) (Aina et al., 2022).

The dropout rate in Spanish universities as a whole is 33% if all years of study are considered, while in private universities this rate is much higher, with 62.1% of students dropping out of the degrees in which they enroll and more than half of those enrolled (51.5%) not completing any type of university studies (Ministerio de Universidades, 2022). According to Aina et al. (2022) the proportion of students who do not complete a degree programme (in the theoretical duration of plus 3 years) ranges from less than 20% in the UK, Israel, Switzerland, and Ireland to more than 40% in Brazil, Slovenia, Chile, Belgium (French Community), Sweden, Italy, Austria, and Estonia.

In the studies analyzed, the most decisive variable in terms of permanence or dropout, in both Spanish and Andalusian universities, was low academic performance. This is in line with other research (Hailikari et al., 2008; Diseth, 2011; Cerezo et al., 2015; Casanova et al., 2018). Academic performance during the first year reflects the academic competences students have when they start university studies or develop during their first year, their levels of engagement and their learning strategies, which could suggest that less successful students have a less well-defined vocational background or the educational pathway that has led them to higher education is not sufficiently grounded (Belloc et al., 2011; Vries et al., 2011). Given the high level of academic dropout,

TABLE 6 Articles addressing the causes of academic dropout in higher education in Spain and, specifically, in Andalusia.

References	University	Scope	Causes of academic dropout
Roso-Bas et al., 2016	University of the Balearics Islands	Health sciences	Students with a pessimistic disposition revealed a greater tendency to drop out. No significant results were found in relation to academic performance.
Ortiz-Lozano et al., 2018	School of Engineering Comillas Pontifical University, Madrid	Engineering	Low academic performance is a major dropout factor.
Monroy and González-Geraldo, 2022	University of Murcia and University of Castilla-La Mancha	Educational Sciences	Low academic performance, as well as: impulsivity, depression, and lack of self-control, self-efficacy, organization, and self-esteem.
Tayebi et al., 2021	University of Alcalá de Henares	Electrical Engineering and Computer Science	Difficulty, followed by poor academic performance and a low degree of motivation, as well as negative relationships with teachers were the main reasons given by students for dropping out. Lack of vocation and distance from home were less frequent reasons.
Lacave et al., 2018	University of Castilla-La Mancha	Computer	The great heterogeneity of the data studied did not allow for a very precise adjustment of the student dropout profile.
García-Holgado et al., 2020	Universities in Spain and Brazil (not specified)	Engineering	The gender gap in engineering careers and the social support: family, friends or teachers, may influence attraction and dropout rates in engineering degrees.
Bernardo et al., 2022	University of Spain (not specified)	(Not specified)	The results indicated that there was an association between having been a victim of cyberbullying and the intention to drop out of a university course, especially when the bullying behavior was social exclusion, impersonation, or dissemination of sexual images without consent.
Rodríguez-Muñiz et al., 2019	Oviedo University	(Not specified)	Influence of personal and contextual variables, low academic performance, part-time or full-time study and age.
Dorta-Guerra et al., 2019	University of La Laguna	Sciences	Academic performance.
Álvarez-Pérez et al., 2014	Santa Cruz de Tenerife University and University of La Laguna	Education sciences	Little support and lack of specific guidance for high-level student athletes.
Álvarez-Pérez and López-Aguilar, 2020	University of La Laguna	Education sciences	Performance at earlier stages is a key determinant of adaptability.
Almeida et al., 2019	University of Oviedo and Sao Francisco University (Brazil)	Psychology	Social, academic, faculty, health and welfare, institutional and financial.
Arce et al., 2015	University of Vigo	Education sciences	Psycho-educational, developmental, family, economic, institutional and social factors. The main reasons for dropping out are related, among others, to incompatibility at work, economic, university (environment, teachers and difficulties) etc.
Romero-Rodríguez et al., 2022	University of Granada	Education sciences	COVID-19
Gómez-García et al., 2022	University of Granada	Education sciences	The COVID-19 outbreak had an impact on the mental health of university students, who experienced an abrupt change in teaching methods as a result of the pandemic, which was associated with a decline in their academic performance and even with dropping out of university.
Lizarte-Simón and Gijón-Puerta, 2022	University of Granada	Education sciences	This study analyzed the dropout risk of first-year students at the University of Granada. The results indicate significant differences within the dimensions of academic and social integration, commitment to the degree, university stress, academic counseling and motivation, financial stress and academic effectiveness.
Álvarez, 2021	University of Granada	Education and sport sciences	The studies analyzed conclude that the causes of university dropout are related to the students' previous educational background, their demographic characteristics, socio-economic level, time at university and academic failure, the use of unsuitable learning methodologies, some characteristics of the degrees studied, and the shortage of scholarships.
Zamora et al., 2020	University of Seville	(Not specified)	Students with a deep approach to learning and a positive view of their future are more likely to persist in their studies than students with a superficial approach to learning and a negative outlook on the future.

Source: Own elaboration.

Causes of academic dropout in Spain. Source: Own elaboration.
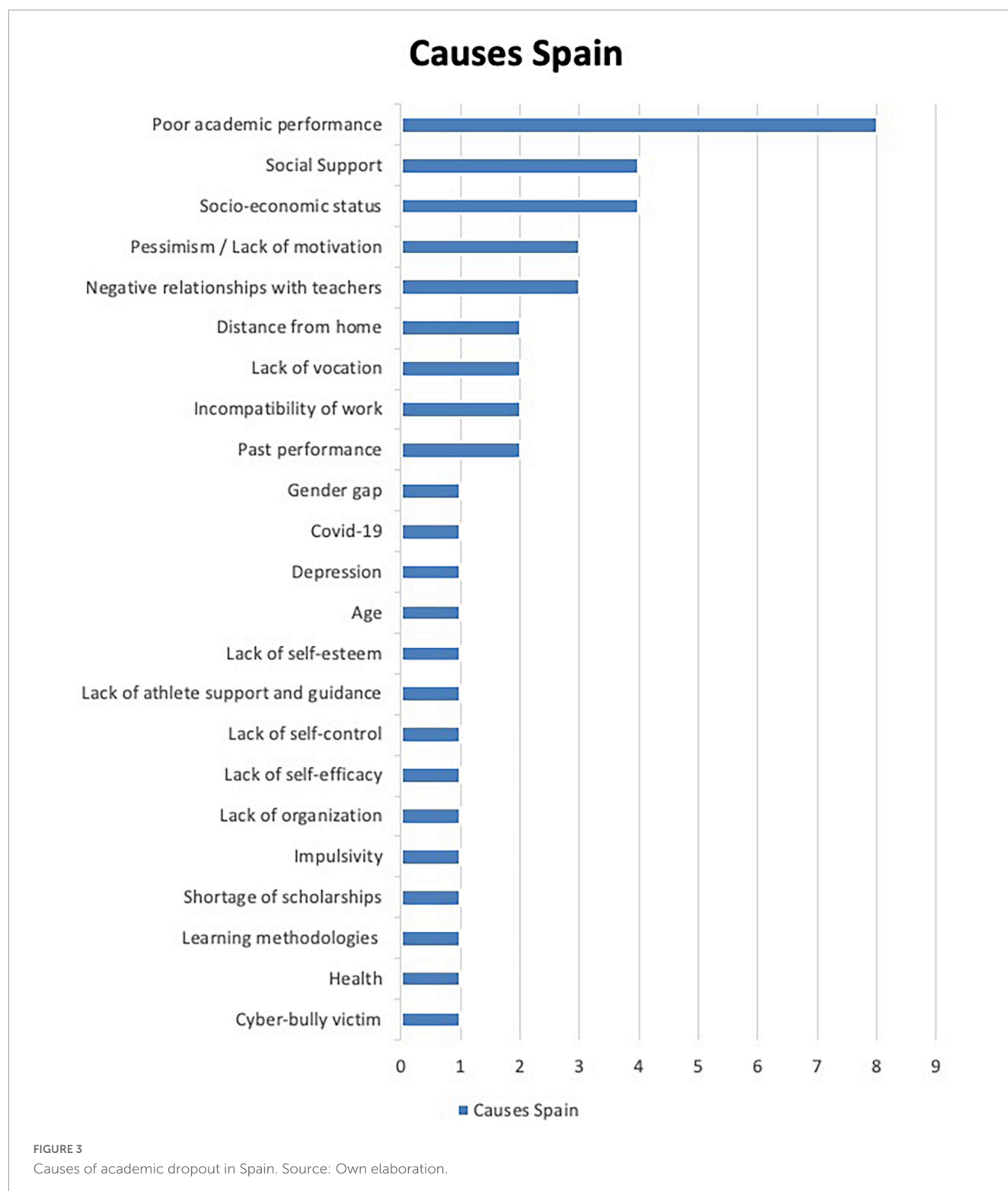
it is necessary to address the different intervening factors through research aimed at determining prior education, the usefulness of university guidance, learning strategies and communication skills.

Lack of social support is the second cause of dropout. Accordingly, in our opinion, interventions to reduce university dropout should encompass, among other factors, helping students to access family support and to develop personal connections at

university to compensate for the absence of family support, as well as academically focused support for students who do not have a strong entry qualification (Sosu and Pheunpha, 2019). In the same vein, Rovira and Bertrán (2018) concluded that university dropout can be minimized through family support, but they also stress the need for university students to be rooted in social capital emanating from the peer group, to have enjoyed positive school experiences and to be boosted by intra-ethnic associationism.
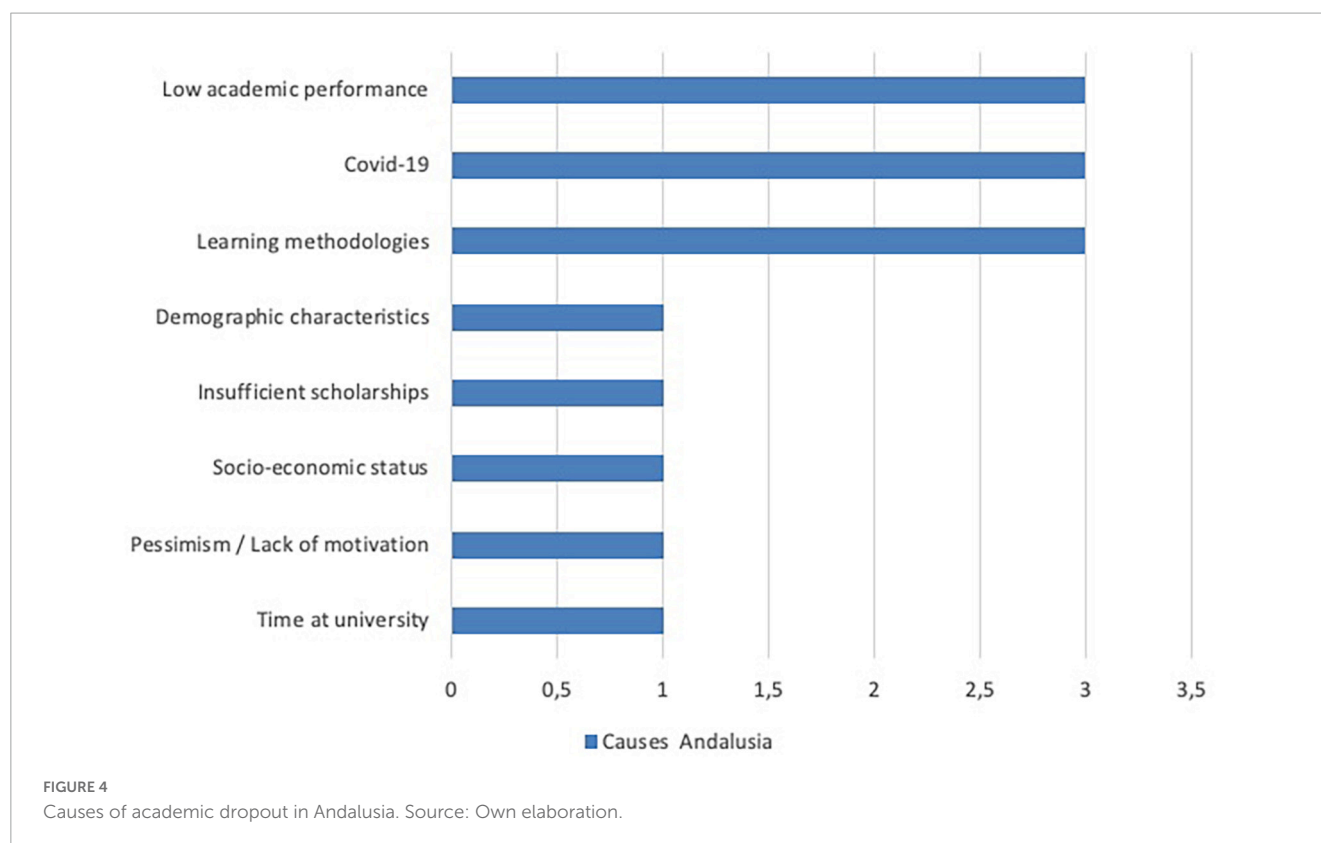
FIGURE 4
Causes of academic dropout in Andalusia. Source: Own elaboration.

TABLE 7 Articles on proposals to prevent academic dropout in higher education.

References	University	Scope	Proposals for prevention
Arco-Tirado et al., 2011	University of Granada	Civil Engineering Economics Pharmacy Chemical Engineering	Tutoring sessions on planning and time management, cognitive and metacognitive learning strategies, motivational strategies, and the use of designed materials.
Gómez-Salazar and Álvarez Gil, 2020	University of Granada	Education sciences	Workshops on collaboration between secondary education and university centers in the pre-university stage.
Rovira and Bertrán, 2018	Autonomous University of Barcelona	Education sciences	Family support, social capital emanating from the peer group, positive school experience, and the impetus received from intra-ethnic associationism.

Source: Own elaboration.

While Arco-Tirado et al. (2011) propose tutoring sessions on planning and time management, together with cognitive and metacognitive learning strategies, motivational strategies and the use of designed materials, Gómez-Salazar and Álvarez Gil (2020) stress the need to anticipate the university stage by offering collaborative workshops between secondary schools and university centers at the pre-university stage to raise student awareness of the curricula, professional opportunities, skills needed to carry out the studies and those that will be achieved upon completion of their degree program.

While present, socio-economic reasons or insufficient scholarships are not the most significant causes of university dropout in Spain or Andalusia (Álvarez, 2021). These factors are very different between countries and national cultures, which influence educational institutions and practices in many ways. It therefore seems reasonable to assume that university dropout is also influenced by differences in national cultures and different levels of economic support (Troelsen and Laursen, 2014). The evidence from the studies reviewed in this article shows that obtaining more scholarships does not reduce the dropout rate and that, in Spain, significant socio-economic gaps do not appear to be a cause of dropout. From a negative social inheritance perspective, this means that students at socio-economic risk in Spain and Andalusia may drop out for exactly the same reasons as the average student. Therefore, the university education system, with its universalistic welfare intentions, seems to work.

6. Conclusion

Although the dropout rate from university studies in Spain is around 21% (for first-year students) and is the highest among its neighboring countries, research on this issue is lacking, with only 25% of Spanish universities having carried out research on this subject in the last 12 years. The studies analyzed in this review conclude that the causes of university dropout are associated

with low academic performance, poor social support in the new academic environment, low socio-economic level, pessimism and lack of motivation, together with other less significant factors such as poor relationships with teachers, lack of vocation, work incompatibility, and previous academic performance, among the most frequently mentioned.

Despite the efforts of the researchers, the main limitations of this work have been found in the search for empirical evidence, as little scientific production has been detected to evaluate the results from a correlational statistical point of view that would allow the authors to analyze the relationship between the key words and their implication in the identified axes (as we have mentioned, only 25% of Spanish universities have carried out research on this subject in the last 12 years). Therefore, it has been difficult to contextualize research on university dropout in Spain and, specifically, in the Autonomous Community of Andalusia, hence the relevance of our study.

The theoretical basis of each of the studies analyzed, the methods described, the universities and the students studied have in turn been very varied and therefore very complex, so another limitation was to synthesize the information. Despite the limitations, the usefulness of the findings may be significant at the higher education level, which could be useful for universities to develop programmes to prevent university dropout.

However, it is important to note that these statistics are simply average relative figures and do not show the heterogeneous components between institutions within the Spanish higher education system (i.e., different dropout rates according to the field of study, university facilities, admission rules, etc.) or within the same autonomous community.

Thus, the clearest line of future research would be to address university dropout, either in all the universities of the Andalusian Autonomous Community or at the national level, in order to obtain conclusions that would allow us to establish correlations between the different causes, territories or universities and, therefore, to find out how widespread this phenomenon is in the different Spanish autonomous communities.

Our study concludes that further research is needed on the causes of university dropout and its prevention through family support, anchoring students in their social roots, promoting positive academic experiences, encouraging associations among peers and, within the university, carrying out activities (such as workshops and seminars) to improve planning and time management, together with cognitive learning strategies, motivational strategies and the use of advanced learning materials [such as Information and Communication Technology (ICT)

tools]. In addition, prior to starting university, secondary school students should be made aware of the curricula, career opportunities, skills needed to pursue the studies and the competences to be achieved upon completion of their studies.

Data availability statement

Author contributions

J-CC-C, M-NC-S, J-AM-D, and J-JV-M contributed to conception and design of the study. M-NC-S organized the database and performed the review. J-JV-M wrote the first draft of the manuscript. J-CC-C and J-AM-D wrote sections of the manuscript. All authors contributed to manuscript revision and read and approved the submitted version.

Acknowledgments

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.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

Acevedo, F. (2020). Factores explicativos del abandono de los estudios en la educación superior en contextos socio-académicos desfavorables. *Rev. Esp. Pedag.* 78, 253–270. doi: 10.22550/rep78-2-2020-02

Aina, C., Baici, E., Casalone, G., and Pastore, F. (2018). The economics of university dropouts and delayed graduation: A survey. *SSRN Electron. J.* doi: 10.2139/ssrn.3153385

Aina, C., Baici, E., Casalone, G., and Pastore, F. (2022). The determinants of university dropout: A review of the socio-economic literature. *Socio Econ. Plann. Sci.* 79:101102. doi: 10.1016/j.seps.2021.101102

Almeida, L. S., Casanova, J. R., Bernardo, A. B., Cervero, A., dos Santos, A. A. A., and Ambiel, R. A. (2019). Construção de um questionário transcultural de motivos de abandono do ensino superior. *Rev. Avaliação Psicol.* 18, 201–209. doi: 10.15689/ap.2019.1802.17694.11

Alonso, P., and Lobato, H. (2005). Elementos que influyen en el fracaso universitario: Un estudio descriptivo. *REOP Rev. Esp. Orientac. Psicopedagogía* 16, 63–79. doi: 10.5944/reop.vol.16.num.1.2005.11363

Álvarez, D. (2021). Análisis del abandono universitario en España: Un estudio bibliométrico. *Publicaciones* 51, 241–261. doi: 10.30827/publicaciones.v51i2.23843

Álvarez-Pérez, P. R., Pérez, P. R. Á, Jorge, D. P., Ramallal, M. E. G., and Aguilar, D. L. (2014). Los estudios universitarios de hombres y mujeres deportistas de alto nivel: Un análisis sobre la difícil relación entre estudios y deporte. *RETOS Nuevas Tendencias Educ. Física Deporte Recreación* 26, 94–100.

Álvarez-Pérez, P.-R., and López-Aguilar, D. (2020). Competencias de adaptabilidad y factores de éxito académico del alumnado universitario. *Rev. Iberoam. Educ. Super.* 11, 46–66. doi: 10.22201/iisue.20072872e.2020.32.815

Arce, M. E., Crespo, B., and Míguez-Álvarez, C. (2015). Higher education drop-out in Spain—particular case of universities in Galicia. *Int. Educ. Stud.* 8, 247–264. doi: 10.5539/ies.v8n5p247

Arco-Tirado, J. L., Fernández-Martín, F. D., and Fernández-Balboa, J.-M. (2011). The impact of a peer-tutoring program on quality standards in higher education. *High. Educ.* 62, 773–788. doi: 10.1007/s10734-011-9419-x

Belloc, F., Maruotti, A., and Petrella, L. (2011). How individual characteristics affect university students drop-out: A semiparametric mixed-effects model for an Italian case study. *J. Appl. Stat.* 38, 2225–2239. doi: 10.1080/02664763.2010.545373

Bernardo, A. B., Galve-González, C., Cervero, A., and Tuero, E. (2022). Cyberbullying in first-year university students and its influence on their intentions to drop out. *High. Educ. Res. Dev.* 1–15. doi: 10.1080/07294360.2022.2057447

Cabrera, L., Bethencourt, J. T., González, M. C., and Álvarez-Pérez, P. R. (2006). Un estudio transversal retrospectivo sobre prolongación y abandono de estudios universitarios. *RELIEVE Rev. Electrón. Investig. Eval. Educ.* 12. doi: 10.7203/relieve.12.1.4241

Casanova, J. R., Cervero Fernández-Castañón, A., Núñez Pérez, J. C., Almeida, L. S., and Bernardo Gutiérrez, A. B. (2018). Factors that determine the persistence and dropout of university students. *Psicothema* 30, 408–414. doi: 10.7334/psicothema2018.155

Cervero, A., Bernardo, A., Esteban, M., Tuero, E., Carbajal, R., and Núñez, J. C. (2017). 'Influencia en el abandono universitario de variables relacionales y sociales', *Revista de Estudios e Investigación en Psicología y Educación*, 12, 46–49. doi: 10.17979/reipe.2017.0.12.2531

Cerezo, R., Bernardo, A., Esteban, M., Sánchez, M., and Tuero, E. (2015). Programas para la promoción de la autorregulación en educación superior: Un estudio de la satisfacción diferencial entre metodología presencial y virtual. *Eur. J. Educ. Psychol.* 8, 30–36. doi: 10.1016/j.ejeps.2015.10.004

Clavijo-Cáceres, D., and Balaguera-Rodríguez, A. Y. (2020). La calidad y la docencia universitaria: Algunos criterios para su valoración. *Rev. Investig. Desarro. Innov.* 11, 127–139. doi: 10.19053/20278306.v11.n1.2020.11688

Cochrane Consumers and Communication Review Group (2016). *Data extraction template for included studies.* Available online at: https://cccrg.cochrane.org/sites/cccrg.cochrane.org/files/public/uploads/det_2015_revised_final_june_20_2016_nov_29_revised.doc (accessed October 26, 2022).

Cohen, J. (1988). *Análisis de poder estadístico para las ciencias del comportamiento*, 2ª Edn. Hillsdale, NJ: Lawrence Erlbaum Associates.

Diseth, Å. (2011). Self-efficacy, goal orientations and learning strategies as mediators between preceding and subsequent academic achievement. *Learn. Individ. Dif.* 21, 191–195. doi: 10.1016/j.lindif.2011.01.003

Dorta-Guerra, R., Marrero, I., Abdul-Jalbar, B., Trujillo-González, R., and Torres, N. V. (2019). A new academic performance indicator for the first term of first-year science degrees students at La Laguna University: A predictive model. *FEBS Open Bio* 9, 1493–1502. doi: 10.1002/2211-5463.12707

European Commission, Directorate-General for Education, Youth, Sport and Culture, Wollscheid, S., Stensaker, B., and Jongbloed, B. (2015). *Dropout and completion in higher education in Europe: Main report. Publications Office.* Available online at: https://data.europa.eu/doi/10.2766/826962 (accessed October 26, 2022).

Eurostat's (2018). *Work beats study for 25% of university drop-outs.* Available online at: https://ec.europa.eu/eurostat/en/web/products-eurostat-news/-/ddn-20180404-1 (accessed February 6, 2023).

Fernández-Mellizo, M. (2022). *Análisis del abandono de los estudiantes de grado en las universidades presenciales en España.* Madrid: Programa Editorial del Ministerio de Universidades.

García, J. S. M. (2009). Fracaso escolar. PISA y la difícil ESO. *Rev. Sociol. Educ. RASE* 2, 56–85.

García-Holgado, A., Gonzalez-Gonzalez, C. S., and Peixoto, A. (2020). A comparative study on the support in engineering courses: A case study in Brazil and Spain. *IEEE Access Pract. Innov. Open Solut.* 8, 125179–125190. doi: 10.1109/access.2020.3007711

García-Peñalvo, F. J. (2019). "Metodología de revisión sistemática de literatura," in *Presentado en la facultad psicología de la pontificia universidad católica del perú (7 de octubre de 2022)*, Salamanca. doi: 10.5281/ZENODO.3249429

Gómez-García, G., Ramos-Navas-Parejo, M., de la Cruz-Campos, J.-C., and Rodríguez-Jiménez, C. (2022). Impact of COVID-19 on university students: An analysis of its influence on psychological and academic factors. *Int. J. Environ. Res. Public Health* 19:10433. doi: 10.3390/ijerph191610433

Gómez-Salazar, N. N., and Álvarez Gil, A. (2020). El papel de la universidad frente al abandono de estudios. Formación pre-universitaria basada en talleres de innovación y creatividad. *Innoeduca Int. J. Technol. Educ. Innov.* 6, 66–72. doi: 10.24310/innoeduca.2020.v6i1.4412

Hailikari, T., Nevgi, A., and Komulainen, E. (2008). Academic self-beliefs and prior knowledge as predictors of student achievement in Mathematics: A structural model. *Educ. Psychol.* 28, 59–71. doi: 10.1080/01443410701413753

Higgins, J. P., Thomas, J., Chandler, J., Cumpston, M., Li, T., Page, M. J., et al. (2019). *Cochrane handbook for systematic reviews of interventions.* Hoboken, NJ: Wiley-Blackwell.

Hinojo-Lucena, F. J., Aznar Díaz, I., Romero Rodríguez, J. M., and Marín Marín, J. A. (2019). Influencia del aula invertida en el rendimiento académico. Una revisión sistemática. *Campus Virtuales* 8, 9–18.

Joulaei, H., and Kalateh-Sadati, A. (2020). COVID-19 outbreak and school dropout; A worldwide challenge for an equitable future. *Int. J. Sch. Health* 7, 1–2. doi: 10.30476/intjsh.2020.88876.1117

Lacave, C., Molina, A. I., and Cruz-Lemus, J. A. (2018). Learning analytics to identify dropout factors of computer science studies through bayesian networks. *Behav. Inf. Technol.* 37, 993–1007. doi: 10.1080/0144929x.2018.1485053

Lara-García, B., González-Palacios, A., González-Álvarez, M., and Martínez-González, M. G. (2014). Fracaso escolar: Conceptualización y perspectivas de estudio. *Rev. Educ. Desarro.* 30, 71–83.

Lizarte-Simón, E. J., and Gijón-Puerta, J. (2022). Prediction of early dropout in higher education using the SCPQ. *Cogent Psychol.* 9:2123588.

López-Martínez, M., Reverte, G. M., and Palacios, M. Mª. (2016). El fracaso escolar en España y sus regiones: Disparidades territoriales. *Rev. Estud. Reg.* 107, 121–155.

Martínez, J. S., and Molina Derteano, P. (2019). Fracaso escolar, crisis económica y desigualdad de oportunidades educativas: España y Argentina. *Papers* 104:279. doi: 10.5565/rev/papers.2574

Ministerio de Universidades (2021). *Estadística de estudiantes.* Available online at: https://www.universidades.gob.es/estadistica-de-estudiantes/ (accessed October 15, 2022).

Ministerio de Universidades (2022). *Datos y cifras del Sistema Universitario Español.Publicación 2021-2022.* Available online at: https://www.universidades.gob.es/wp-content/uploads/2022/11/Datos_y_Cifras_2021_22.pdf (accessed October 15, 2022).

Moher, D., Altman, D. G., Liberati, A., and Tetzlaff, J. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med.* 6:e1000097. doi: 10.1371/journal.pmed.1000097

Monroy, F., and González-Geraldo, J. L. (2022). Development of a procrastination scale in Spanish and measurement of education students' procrastination levels. *Bordón Rev. Pedag.* 74, 63–76. doi: 10.13042/bordon.2022.93054

Noriega, G., and Arjona, B. A. (2011). El fracaso escolar universitario. *Perspect. Docentes* 47, 39–46.

OECD (2017). *Education at a Glance: OECD Indicators.* Paris: OECD Publishing. doi: 10.1787/eag-2017-en

Ortiz-Lozano, J. M., Rua-Vieites, A., Bilbao-Calabuig, P., and Casadesús-Fa, M. (2018). University student retention: Best time and data to identify undergraduate students at risk of dropout. *Innov. Educ. Teach. Int.* 57, 74–85. doi: 10.1080/14703297.2018.1502090

Pertegal-Felices, M. L., Valdivieso-Salazar, D. A., Espín-León, A., and Jimeno-Morenilla, A. (2022). Resiliencia y abandono académico en estudiantes universitarios ecuatorianos durante el COVID-19. *Sustainability* 14:8066. doi: 10.3390/su14138066

Pompa, ÁL., Ponz, N., Rama, V., and Ríos González, J. A. (2003). Fracaso universitario: ¿ilusión o realidad? *REOP Rev. Esp. Orientac. Psicopedagogía* 14:81. doi: 10.5944/reop.vol.14.num.2.2003.11613

Portal, E., Arias, E., Lirio, J., and Gómez, J. L. (2022). Fracaso y abandono universitario: Percepción de los(as) estudiantes de Educación social de la Universidad de Castilla La Mancha. *Rev. Mex. Investig. Educ.* 27, 289–316.

Real, M. R. (2011). El liderazgo de los centros educativos y las buenas prácticas ante el fracaso escolar y la exclusión social en la comunidad autónoma de Andalucía. *Rev. Investig. Educ.* 9, 157–167.

Rodríguez-Muñiz, L. J., Bernardo, A. B., Esteban, M., and Díaz, I. (2019). Dropout and transfer paths: What are the risky profiles when analyzing university persistence with machine learning techniques? *PLoS One* 14:e0218796. doi: 10.1371/journal.pone.0218796

Romero-Rodríguez, J.-M., Hinojo Lucena, F. J., Aznar Díaz, I., and Gómez García, G. (2022). Digitalización de la Universidad por Covid-19: Impacto en el aprendizaje y factores psicosociales de los estudiantes. *RIED Rev. Iberoam. Educ. Distancia* 25, 153–172. doi: 10.5944/ried.25.2.32660

Romero-Rodríguez, J.-M., Ramírez-Montoya, M. S., Aznar-Díaz, I., and Hinojo-Lucena, F. J. (2020). Social appropriation of knowledge as a key factor for local development and open innovation: A systematic

review. *J. Open Innov. Technol. Mark. Complex.* 6:44. doi: 10.3390/joitmc60 20044

Roso-Bas, F., Pades, A., and García-Buades, E. (2016). Emotional variables, dropout and academic performance in Spanish nursing students. *Nurse Educ. Today* 37, 53–58. doi: 10.1016/j.nedt.2015.11.021

Rovira, J. P., and Bertrán, M. (2018). Factors afecting educational success and continuity among Young people of Moroccan descent in Catalonia (Spain). *IJERI Int. J. Educ. Res. Innov.* 10, 179–189.

Ruiz-Corbella, M., and López-Gómez, E. (2019). La misión de la universidad en el siglo XXI: Comprender su origen para proyectar su futuro. *Rev. Educ. Super.* 48, 1–19. doi: 10.36857/resu.2019.189.612

Sánchez-Meca, J. (2010). Cómo realizar una revisión sistemática y un meta-análisis. *Aula Abierta* 38, 53–64.

Sosu, E. M., and Pheunpha, P. (2019). Trajectory of university dropout: Investigating the cumulative effect of academic vulnerability and proximity to family support. *Front. Educ.* 4:6. doi: 10.3389/feduc.2019.00006

Tayebi, A., Gomez, J., and Delgado, C. (2021). Analysis on the lack of motivation and dropout in engineering students in Spain. *IEEE Access Pract. Innov. Open Solut.* 9, 66253–66265. doi: 10.1109/access.2021.3076751

Torres, A. E., Brito-Cruz, T., del, J., Pérez-Jaimes, A. K., and Lara Gamboa, C. C. (2021). Reprobación escolar: La percepción del estudiante universitario. *Educateconciencia* 29, 77–93.

Troelsen, R., and Laursen, P. F. (2014). Is drop-out from university dependent on national culture and policy? The case of Denmark: Is dropout from university dependent on national culture and policy? *Eur. J. Educ.* 49, 484–496. doi: 10.1111/ejed.12094

Vries, W. D., León Arenas, P., Romero Muñoz, J. F., and Hernández Saldaña, I. (2011). ¿Desertores o decepcionados? Distintas causas para abandonar los estudios universitarios. *Rev. Educ. Super.* 40, 29–49.

Zamora, Á, Gil, J., and De Besa, M. R. (2020). Enfoques de aprendizaje y perspectiva temporal: Persistencia en estudiantes universitarios. *Educación XX1* 23, 17–39.

![frontiers] Frontiers in **Education**

Factors contributing to university dropout: a review

Oswaldo Lorenzo-Quiles ⓘ *, Samuel Galdón-López ⓘ and
Ana Lendínez-Turón ⓘ

Faculty of Education and Sports Sciences, University of Granada, Melilla, Spain

Introduction: Dropout is one of the problems that the university education system has to face every year. The educational community is involved in the reasons for its trajectory as a social problem, which does not exempt any student in the world. Its study and improvement of the education system is a key element in changing the course of university dropout and alleviating its rapid growth in society.

Methodology: Using a quantitative and qualitative methodology, an attempt is made to provide answers to the objectives pursued by the research.

Objectives: To analyze student satisfaction, to specify the causes of dropout, and to determine the most appropriate authors on dropout by means of literature and different databases.

Conclusions: It is concluded that, are five main major components would be behind university dropout: student adaptation, personality, socio-economic level, teacher−student relationship, and quality in university education. With them come certain sub-causes that must be taken into account for a better understanding of the reasons for university dropout, such as demotivation, low self-esteem, frustration, pregnancy, among others, reasons why their study is essential for their future eradication.

KEYWORDS

higher education, university dropout, retention, university community, students

1. Introduction

University dropout is a phenomenon, as distinguished as it is problematic, worldwide due to its high dropout rates. The Organization for Economic Co-operation and Development (OECD, 2019) reports that 20% of students who start tertiary studies fail to complete them. According to the latest statistics published by Eurostat (2020), Malta is the country with the highest university dropout rate with 18.4%, followed by Spain with 18.3%, and, in third place, Romania with 18.1%. If we examine the percentage of students who drop out of a Bachelor's degree, we can see that this percentage is increasing significantly, which is a problem. In the latest report published by the Ministry of Education and Vocational Training (MEFP, 2019), 30% of students drop out of Spanish universities, mainly during the first year of studies. The dropout rate in the first year of a Bachelor's degree, of the new 2014–2015 cohort, stands at 21.5%.

In this regard, in Spain, specifically in Andalusia, recent reports such as the one published by the Independent Authority for Fiscal Responsibility (AIReF, 2020) show that the university dropout rate in Andalusia is considerably higher than the average for the Spanish university system as a whole. The above data, which are worrying if we bear in mind that European institutions set themselves the target of reducing university dropout rates to 10% by 2020, lead to multiple consequences at an academic and structural level in higher education, as well as socio-economic effects, which can be seen in the student body, the university institution, and the State as a whole (Agudo, 2017).

When a student drops out of a degree program, he or she suffers a situation of failure, which causes damage and psychological suffering; a problem that extends to the family environment. Similarly, the university institution is also affected, as the failure of its student's casts doubt on the effectiveness of the teaching staff, the organization of the curriculum, the resources available, etc. On the other hand, for the state, it means instability in the higher education system that affects society as a whole, due to the large economic costs it invests without achieving the expected educational objectives for the population (González et al., 2007).

In times of economic hardship, capital plays a very important role. Therefore, in terms of profitability, investment in education ceases to be profitable if there are high levels of university dropouts (Corominas, 2001).

Martínez (1999) and Carrera and Mazzarella (2001), in their studies, make it possible to go to the heart of the phenomenon and study it in its development. In order to understand and interpret them, special attention must be paid to those agents (teachers, peer groups, and family) who intervene as mediators in the students' decision-making process, in order to know the effectiveness of their actions in solving the problem of university dropout, among other factors that will be presented later in the following sections.

Continuing along these lines, it is worth highlighting the educational scenarios in which university dropout occurs, starting with the types of dropout and the factors that influence them.

Beginning with the fate of students who drop out temporarily, this gives rise to a new classification: internal or external dropout (Elias, 2008).

Internal drop-out occurs when a student who has left a degree program starts other studies at the same institution. In most cases it happens during the first semesters as a consequence of choosing a degree program based on incorrect motivations or not having received adequate guidance before entering university (Torres, 2018; Hernández-Jiménez et al., 2020). However, if the student starts studies at another institution, this generates what is known as external dropout. According to Corominas (2001), the student may continue to remain in the same degree program, although for reasons of internal or external dissatisfaction, or due to life circumstances, he or she moves to another university. It may also happen that the student continues his or her academic training in other types of studies at a lower level than university (training cycles, non-regulated education, etc.).

On the other hand, there may be different situations for the students themselves, especially for new students: It should be emphasized that the student who is taking a degree may have previously abandoned another degree or simply have passed a specific test such as the EBAU. In this sense, a student starting a university program may be in the situation of having to take the whole academic load to obtain the degree or have a part of it validated and, consequently, be able to access a higher course.

At a scientific level, it is necessary to consider both characteristics, although special attention is paid to the most numerous groups, as it is the one that enters the university system without having previously left another degree and, therefore, does not have any validated subjects. Project Alpha Guide, DCI-ALA/2010/94 (2013) corroborates that, given the difficulty of accurately selecting the group of students who have previously abandoned a university degree, work is done on the students of a new entry cohort, defined as: "The group of students who enroll for the first time in the first year (semester) of the degree course (degree) T at the University U in the academic period X" (p. 13). However, with the intention of showing the positive side of the phenomenon to future newcomers to the system, studies on university dropouts could take into consideration this group of students who, after abandoning their studies and redirecting them, manage to redirect their academic trajectory thanks to the option of leaving the Higher Education system internally or externally. In this sense, it can be seen that university dropout is a dynamic phenomenon that is in continuous evolution. As can be observed in the literature, university students can follow multiple trajectories when leaving a higher education degree.

In order to achieve a better understanding of the phenomenon, it is necessary to investigate the theoretical models that have been developed throughout history, as well as their theories. For a better understanding, we will point out the different theories and models that provide the bases and factors that produce this phenomenon in higher education classrooms.

2. Background and theoretical framework

There are several attempts to build theoretical models to explain the phenomenon of university dropout, which is a problem that the current university system has to deal with.

These phenomena not only concern students, but also the teaching staff, the institution, and family members, and in general involve the entire university community. Some authors, such as De Vries et al. (2011), Merlino et al. (2011), and more recent authors such as Álvarez (2021), allude to both voluntary and involuntary factors, causes that may or may not be related to the university community itself, thereby implying a loss of capital for family members, the school/university environment, and the country itself, in addition to the feeling of frustration. Therefore, they relate it to personal causes, such as the motivation of the students themselves and their own academic performance, due to pregnancy or poor integration of the student, lack of motivation and loss of interest in studies, low self-esteem, among others (Merlino et al., 2011; Álvarez, 2021; Lorenzo, 2021).

In this sense, frustration plays a very important role in cases of university dropout, as studies show that 45% of students who have dropped out are due to fear, stress, and difficulties encountered in the content; on the other hand, 51% have been due to physical and mental exhaustion (Vera and Álvarez, 2022). These causes are common among university students, due to the various obligations that the degrees demand, as well as other types of work or social commitments. These causes were raised by authors such as Estrada et al. (2017), which he called academic burnout, where this academic, personal, and mental exhaustion endangers the quality of life and wellbeing of university students.

Although university burnout is more prone to occur at school age, it also occurs in the university environment and its study should be considered, which is not only perceived on a mental level, but also on physical levels such as muscle pain, headaches, or sleep disorders (Vera and Álvarez, 2022). The multiple emotional, mental, and physical causes are present in

FIGURE 1
Maslow's pyramid.
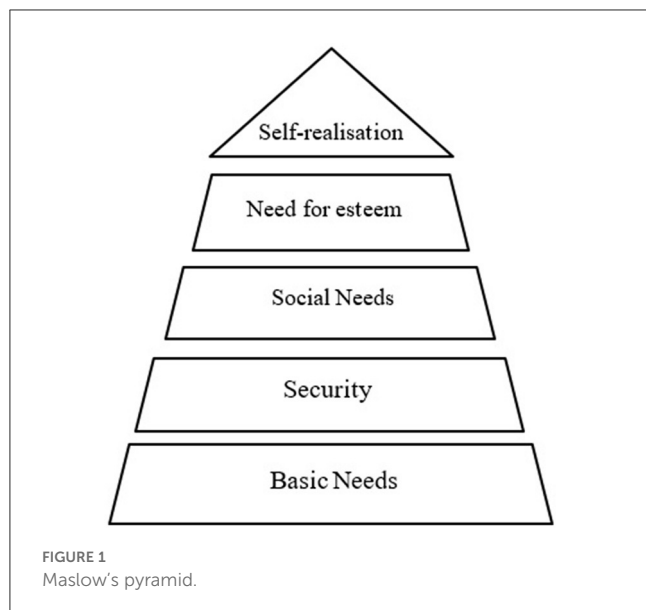
the university community and their risk is not exempt to any of the students, taking care of motivation, self-esteem, student satisfaction, and satisfaction in their work and themselves are key to personal and emotional development, making it an essential premise in order to keep students in university institutions.

With an emphasis on motivation and academic performance, combating the emotional disturbance produced by the burnout effect is fundamental. There are direct links between the motivation of the student body and the academic performance of students. On the one hand, they have to meet the demands of university courses, which leads to situations of stress, anxiety, etc. (Vera and Álvarez, 2022), directly affecting students' academic performance, demotivating them, and causing them to feel negative and insecure, which ends up leading them to drop out of their studies.

Motivation in students is essential for the achievement of their educational goals and their future attainment of their corresponding degree. This makes it necessary to highlight Maslow's Pyramid (Figure 1), which supports the needs of human beings for their own motivation (Turienzo, 2016).

Firstly, there are the students' basic or physiological needs, food, maintaining their own health, and rest. Next, the need for security, feeling safe and protected, having a job, among others. Social needs, where affective development, association, acceptance, and affection are involved. On the other hand, the need for self-esteem, where we find the recognition of the person, confidence, respect, and success and the one at the top, the need for self-realization, referring to the development of the potential of students, refers to confidence, respect, and self-recognition, this last step has had several problems for its own verification, as indicated by the author Turienzo (2016), this is so because happiness is something that is relative and variable.

Taking this pyramid into account, it is clear how essential it is to motivate students, to consider their needs and not to ignore those signs that can give us clues about their situation, promoting quality education, understanding different scenarios, and avoiding, as far as possible, that students drop out of their careers.

All these factors that affect students on a personal and social level are not only exempt in Spain, it is a worrying issue at a global level, as Lydner (2022) explains in his research, where the problem is reflected throughout the American territory, which ensures that it has been a severe problem for two decades and that it should not be kept as an isolated case. In this case, emotional factors have been one of the main causes, together with feelings of failure and guilt.

In another study by Weinstock (2017), he reiterates some of the statements made above, emphasizing that one of the main causes is depression. The data obtained from 10 US universities and 1,100 first-year students, where depression was one of their first choices for university dropout, caused by the pressure to perform well both academically and in their extracurricular activities. Of all students entering universities in the United States, research shows that twenty-five percent (25%) have achieved the minimum American College Test (ACT) threshold in all four subjects. On average, very few students are able to meet the threshold for all of their high school classes (Polumbo, 2017).

With all these statements, it is important to study the importance of the study, in order to continue to deepen the fundamental role of the education system and the way it combats university dropout, improving and achieving its future eradication.

Looking at the literature, we find that several authors throughout this century have tried to find answers to the causes that lead university students to abandon their academic education.

2.1. Models of university dropout

These models presented by the authors can be distinguished into five main approaches: adaptive models, psycho-pedagogical model, organizational model, economist model, and interactionist model.

- Adaptation or sociological model: family background and personal attributes of the pre-university experience are involved. These characteristics combine to influence commitment to the institution, as well as achieving the ultimate goal of graduation or graduation (Himmel, 2018). This model is underpinned by Durkheim's theories of suicide. Which implies that students break directly with the social system due to their lack of integration in the university community (Viale, 2014). Therefore, this model covers those students who have not adapted and have therefore dropped out of the degree program.
- Psychopedagogical model: the main characteristic of this model refers to the personality traits of university students, distinguishing between those who complete their degree and those who do not. Student failure is determined in this case by the psychological characteristics of the student him/herself.
- Economist model: this model is based on the application of the cost-benefit approach. It argues that the investment of time and money does not always generate social and economic benefits for university students.
- Organizational model: this model argues that dropout depends on the qualities of the organization in social integration, and more particularly on the dropout of the students who enter it.
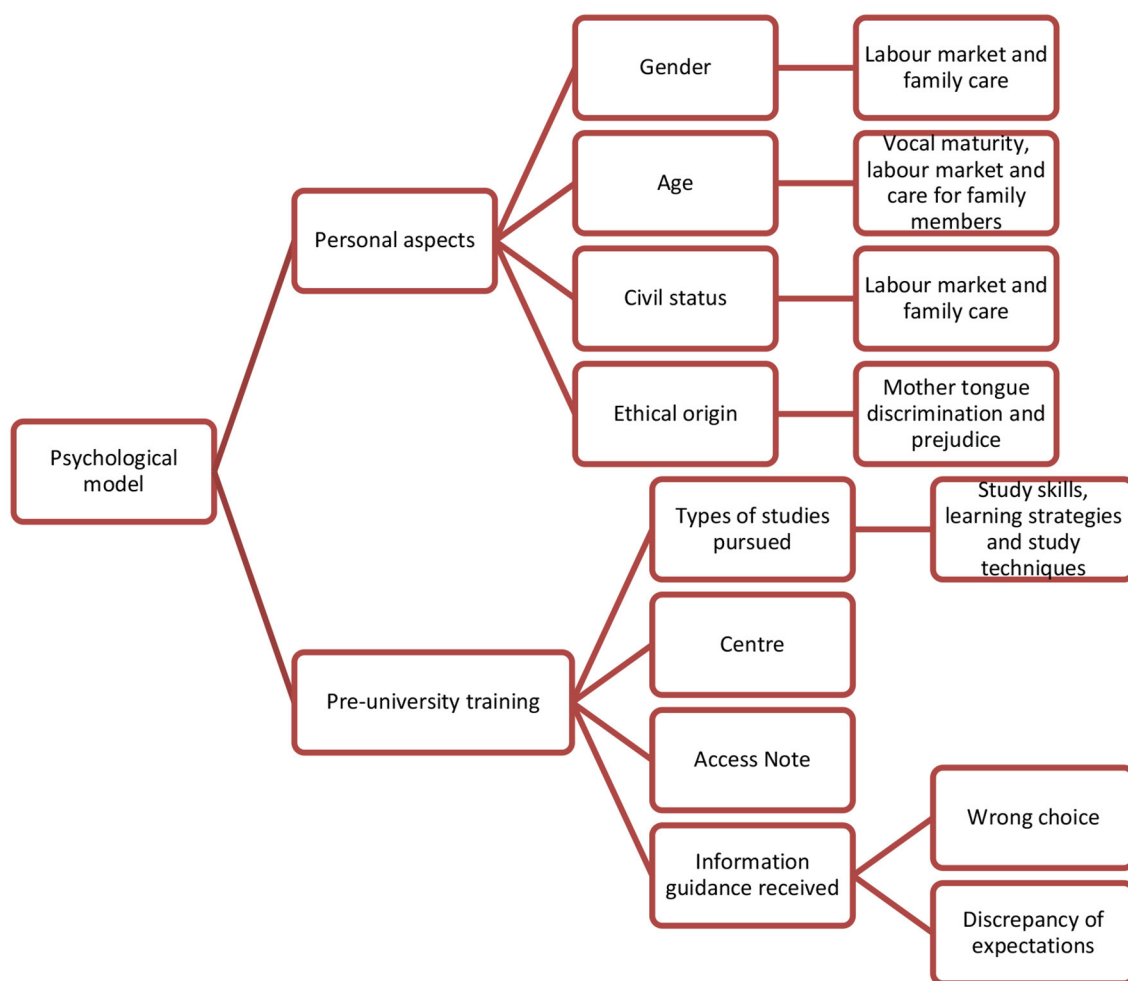
FIGURE 2
Personal and pre-university variables that make up the psychological model of university dropout. Based on Pedraza (2021).

It emphasizes the quality of the teaching and the active learning process in the classroom (Himmel, 2018).

- Interactionalist model: where it is understood that the main reason for university students dropping out lies in the way they interact with their teachers and classmates. Tinto (1987) already started from the idea of interaction between classmates and between teacher and student, since the greater the interaction between these groups, the greater the possibility of students finishing their studies.

Knowing some of the factors associated with dropout and patterns, it is worth highlighting how all these factors could be classified.

On the one hand, there are those related to the students themselves, stressing the importance of age, gender, ethnicity and even the marital status of the students. Al Ghanboosi and Alqahtani (2013), in their studies to discover the dropout variables, look at the data from the explorations published annually in two universities in the United Arab Emirates and the information from the data obtained to determine that university dropout mainly affects younger students, given their low vocational maturity. Notably,

82% of students entering university are under 25 years old (OECD, 2017). Authors such as García de Fanelli (2014), after carrying out a literature review of different sources published between 2002 and 2012, highlight that non-traditional students above the age of 25 also drop out of university. However, the causes of these dropouts are different because they are mainly attributed to the need to allocate time to work and family. In the work of Severiens and Dam (2012), the causes of female dropouts are often attributed to caring for family or children. Men, however, drop out of school in order to enter the world of work. Thus, drop-out can be attributed to the gender of the students. In general terms, research shows that male dropouts prevail over female dropouts, even though the percentage of men enrolled in university is lower (Rodriguez, 2013).

Numerous studies show that certain populations made up of ethnic minorities or specific groups, such as people with difficulties and highly competitive athletes, have a higher risk of dropping out of university (Gairín et al., 2013; Fonseca and García, 2016). It should also be taken into account that belonging to an ethnic group implies having a different mother tongue from the official language in which classes are taught; in other cases, it entails suffering experiences of discrimination and prejudice that have negative

consequences not only on learning outcomes, but also on students' social adaptation (Abbate, 2008; Cabrera et al., 2014). Based on this deduction, Planas et al. (2011) point out the importance of promoting tutorial action that contributes to the personalization of education, attending to the integrity of the individual, predicting learning difficulties in studies, and avoiding phenomena such as university dropout as a result of adjusting the educational response to the specific needs of students.

At this point, the aspects inherent to students' pre-university academic training should be pointed out, as they have repercussions on their university careers. In general, not much attention has been paid to the process developed by students prior to dropping out of their studies and the analysis of the factors that influence the intention to drop out has been neglected in order to carry out preventive programs. Reducing university dropout requires a thorough understanding of the phenomenon as a whole, which implies the analysis of academic factors prior to entering university, such as the information received to choose a degree, the university entrance grade, the type of studies taken, and the center of origin. Duque et al. (2013) conducted a quantitative study in three Catalan universities in order to identify the factors that influence the trajectory of students and their relationship with the intention to drop out. The study shows that 51% of students had considered dropping out of their studies at some point, with the most common reasons for dropping out being the wrong choice of degree program and a discrepancy in expectations.

Generally speaking, students have difficulty in making a career choice at 17 or 18 years of age (Nieman, 2013; García, 2014) or do not obtain adequate information to make this important decision (Castejón et al., 2015; García and Adrogué, 2015). In this regard, Silver Wolf et al. (2017) argue that more information and guidance prior to entry could reduce the rate of early dropout. Students who are more likely to drop out in the first year should receive more detailed information about the content of the course to be taught so that high levels of stress and frustration are not generated, which have an unfavorable impact on the decision to stay in their chosen degree program (Meyer and Thomsen, 2018). The choice of a degree program, on the other hand, is influenced by the entrance qualification required by each institution. The entrance qualification is also presented as a variable that influences dropout, as there is a close relationship between prior academic performance and university performance. In fact, there are many studies that confirm that prior academic performance is significantly correlated with performance in university studies, with the highest correlation being found in technical and experimental degrees. According to Puertas Cañaveral and De Oliveira Sá (2017), having higher grades in Compulsory Secondary Education and Baccalaureate significantly reduces the risk of dropping out of university.

Figure 2 shows the relationship between the variables that make up the psychological model of university dropout. On closer examination, it can be seen that this model includes each of the personal and inherent aspects of pre-university academic training mentioned above.

From the sociological model we focus specifically on family aspects. According to Spady (1970), the student's pathway not only depends on the psychological characteristics mentioned above, but is also influenced by external factors such as the family environment, which sometimes hinders the student's integration

TABLE 1 Databases used.

Source	Descriptor	Results
ERIC https://eric.ed.gov/	University dropout	213
Web of Science https://www.webofscience.com/ wos/alldb/basic-search	University dropout	1,535
Google Scholar https://scholar.google.es/	University dropout	31,100
Total		32,848

into the Higher Education system. After reviewing the literature, we observed that the size of the family, the type of housing, the educational and economic level of the parents, the cultural capital, and the presence of difficulties, constitute the family aspects with the greatest influence on university dropout.

Another factor to take into account in university dropout is the educational level of the parents. Stephens et al. (2012), after conducting a principal components study, found that the probability of dropping out of a degree decreases the higher the educational level of the family. The literature reflects the importance of the parents' educational level, particularly the mother's educational level. Marchesi (2000) considers that mothers attach greater importance to academic duties and are more concerned about their children's performance, orienting them toward continuing their studies. Therefore, when mothers' academic level is higher, children perceive greater support for their studies and seek to achieve the goal of graduating.

Previously, Castejón and Pérez (1998) stated that this effect is due to the decision made by fathers to delegate their children's education to their mothers. Closely linked to the parents' educational level is the family's cultural capital. This refers to the set of social positions or assets that it possesses thanks to the right to education, such as the availability of economic resources, access to the internet or family relationships marked by discussions that promote knowledge. All this accumulation of cultural knowledge has a significant influence on students' academic results, favoring adaptation. In this sense, it is worth noting that, in recent decades, access to the Internet has become a powerful cause of inequality (Garbanzo, 2007). People who have economic resources of this type are more prepared to adapt to the knowledge society, as they have a very important added value, which is the possibility of broadening their culture.

Sometimes, students' careers are interrupted by the presence of family difficulties that generate discouragement. Despite their low frequency, there are situations, such as the appearance of an illness or the death of a family member, which lead students to make the decision to abandon their university studies (Rodríguez-Pineda and Zamora-Araya, 2020). In line with Severiens and Dam (2012), students who are more affected by situations of this type are women, as they feel the need to take care of the family. Other family variables associated with female dropouts are pregnancy, childbirth, and marriage.

FIGURE 3
PRISMA flow chart. Source: Own elaboration.
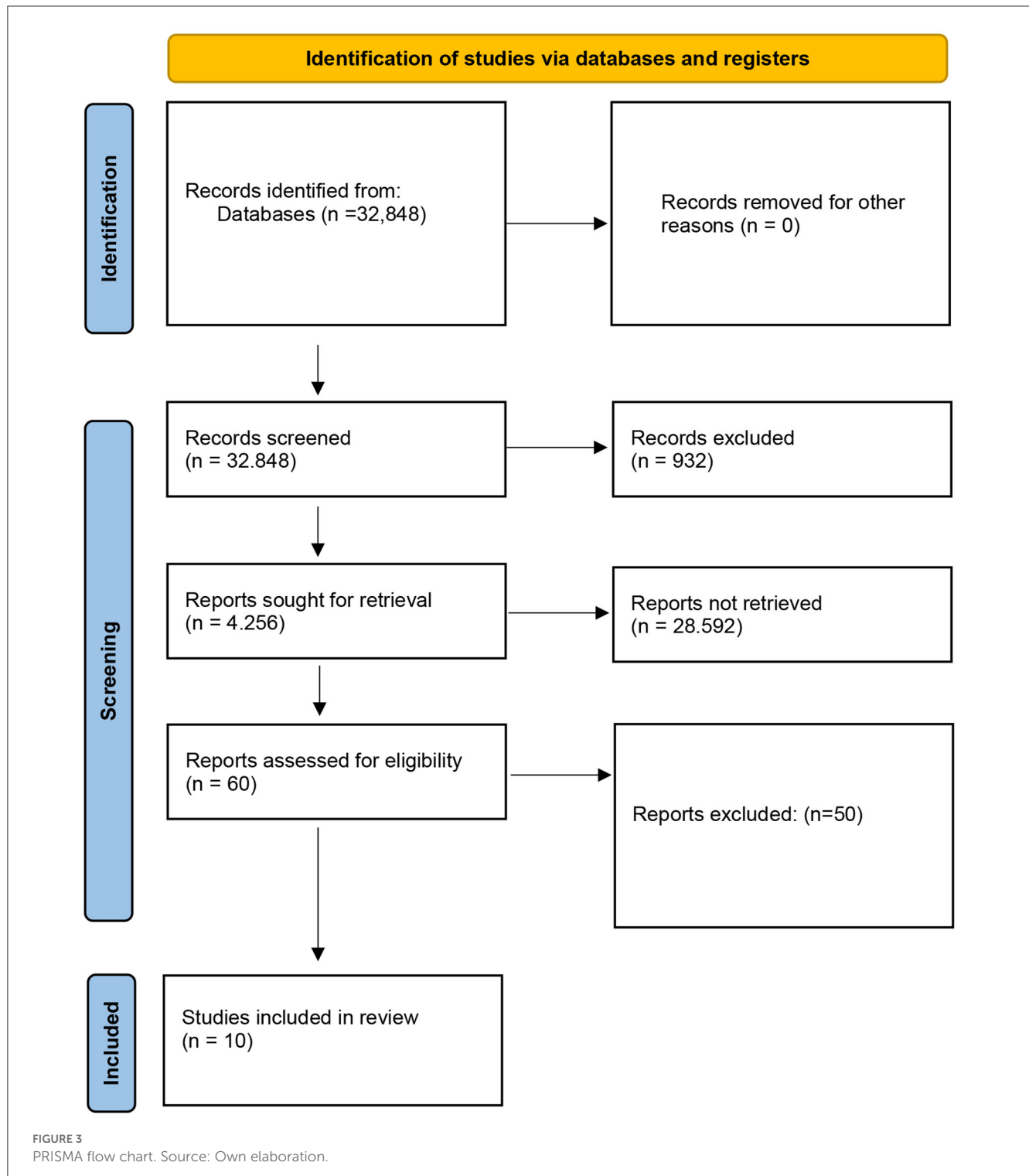
Finally, through the economistic model, the influence of socio-economic aspects that hinder students' academic development is accentuated. The scientific literature emphasizes the student's purchasing power, their employment situation, the way they finance their studies, the lack of economic resources to cover transport costs, tuition, materials, among others, and family responsibilities in the presence of economic difficulties. In a qualitative analysis of 25 semi-structured interviews, Lehmann

(2007) observes that middle-class students experience academic difficulties during their university studies. These difficulties may be the result of a lack of social integration, which causes students to have doubts about their ability to achieve a university degree (Aries and Seider, 2005); or the result of not having sufficient financial resources to pay for the costs of university (Ariño and Llopis, 2011). Fortunately, students who come from affluent families are more likely to pass higher education (MDSyF,
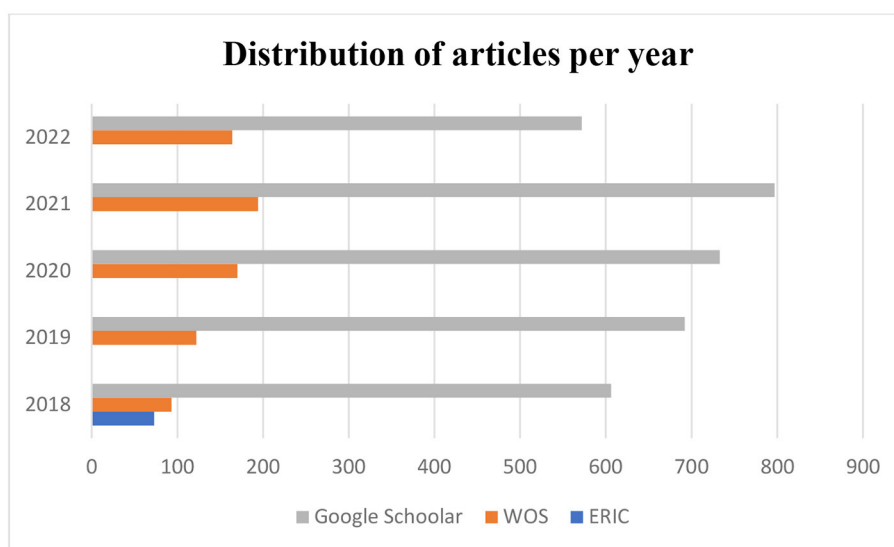
Distribution of articles per year

FIGURE 4
Distribution of articles by year. Source: Own elaboration.

2003), and thus obtain a better employment situation (Lehmann, 2007).

It is worth noting that the opportunities offered by the labor market are not equal for men and women. According to an OECD (2010) statistical report, women with university degrees earn only 71% of what men earn. This results in students' decision-making. Severiens and Dam (2012) state that, in the presence of family difficulties, men enter the labor market earlier than women in order to be able to obtain greater economic benefits. Even without higher education, the economic benefits for men are higher than for women without a university degree (Jacob, 2002; Evers and Mancuso, 2006).

It is true that combining studies with work is a complicated task, as it requires a lot of time. Therefore, the risk of dropout in students who work is higher (Sevilla et al., 2010; Íñiguez et al., 2016). Through an analysis, Castaño et al. (2008) reveal that being financially dependent on oneself as a student increases the risk of dropping out of university. However, working in the last year of the degree does not affect this, and it is possible to combine academic and work responsibilities.

On the other hand, Gury (2011) pays special attention to the number of hours students spend working. After conducting a statistical analysis of historical dropout events in Bolivian Higher Education, the author states that working part-time during the first years of university increases the probability of dropping out, after which it remains insignificant. Those students who support their studies thanks to financial aid from parents or a financial institution are less likely to drop out (Jones-White et al., 2014; Ononye and Bong, 2018). However, if we analyze the scholarship system in Spain, we observe that there is an imbalance between the cost of enrolment and the aid provided by the state. In 2009, the average cost per ECTS credit in Spanish public universities was €13.85, which increased to €18.51 in 2015. This difference of almost €5 meant an increase in tuition fees, from €800 to more than €1,100.

Despite this, the amount of study grants remained at the same levels as in the academic year 2006/2007 and only 27% of students received grants (CRUE, 2016).

Moreover, on certain occasions, students who receive a grant do not achieve the average mark required by the administration and are excluded from the criteria to obtain the grant for the next academic year. This fact causes substantial changes in the students, who consider the decision to drop out due to the increase that a new enrolment implies (Sacristán, 2018). The difference becomes greater as the student fails and has to enroll repeatedly in the same subject. But it should be borne in mind that changes in personal and family conditions are strongly associated with socio-economic aspects that influence university dropout. Long et al. (2006) emphasize that unexpected situations such as the loss of the breadwinner's job, the death of the father or the need to enter the world of work are factors that prevent students from continuing their university studies, as they are obliged to support their families. The socio-economic variables referred to above show the vulnerability of various groups of students who do not have a solid family structure to help them alleviate the effects of these variables on their university careers. This situation should be taken into account by educational institutions and government policies on Higher Education, which tend to allocate subsidies to university access and not so much to permanence (Pedraza, 2021).

On the other hand, the variables that depend on the subject and institution itself pay special attention to the characteristics of the curricula, the human, and material resources that institutions possess, the quality of teaching, and the interpersonal relationships that occur in the classroom between students and teachers (Pedraza, 2021). It should be noted that the multiplicity of curricula in different institutions makes it difficult to analyses the organizational variables that interfere with students' university careers (Fonseca and García, 2016). Even so, several authors such as Tejedor and García-Valcárcel (2007) analyses which organizational

variables interfere in the academic performance of students belonging to different types of institutions: sciences, biomedical, social sciences, economics-legal, and arts. After carrying out linear combinations between the different variables, the authors observe that the excessive number of subjects that students must take and the 4-month nature of these subjects have an impact on their low performance. Moreover, given the intrinsic difficulty of the subjects and the demands of the teachers, students suffer from stress and anxiety, which generates doubts about their intellectual capacity to successfully complete their chosen degree. Unfortunately, when the number of failures prevails over the number of passes, students decide to drop out rather than extend their study plan over time (Esteban et al., 2017).

On the other hand, the excessive number of assignments and exams throughout the degree increases the level of frustration of students, as it generates too much academic workload that they must combine with their family and work life (Castillo, 2010). Other organizational variables that affect students' academic performance are the lecturer/student ratio, the class schedule and the number of practical classes (Tejedor and García-Valcárcel, 2007). Higher education institutions should create spaces where teachers can meet with students, give them feedback on the academic activities developed and produce new activities that allow them to apply knowledge to concrete situations in order to favor the creation of academic and social networks that help to improve the educational climate. Actions of this kind are essential during the first year of studies. Students entering university for the first time tend to suffer from "academic shock" due to the change between high school and university. Along these lines, university classes are dedicated to instruction, students have to organize their studies on their own, manage their time and academic resources, as well as combine their academic life with outside activities or work (Lorenzo and Zaragoza, 2010).

Tejedor and García-Valcárcel (2007) point out that the lack of individualized treatment, pedagogical deficiencies, the development of inadequate activities, the lack of clarity of exposition, the lack of information on assessment criteria and the poor use of didactic resources are factors inherent to teachers, which determine the poor university performance of students. It is therefore advisable for teachers to provide information about the assignments and exams to be developed, to comply with the assessment criteria and to leave aside subjectivity in marking. Tutoring and educational guidance sessions throughout the university stage allow students to develop intellectual skills that favor their academic performance (Doerschuk et al., 2016). This support should be provided by teaching staff who are able to interact with students (Lázaro, 2003) and/or upper-level university students who are able to create supportive relationships (Mori, 2012). It should be noted that peer support is a process of accompaniment that helps to overcome fears, frustrations, anxieties, or other barriers that prevent the correct development of university life.

Therefore, many studies have tried to analyze the individual, social, economic, and institutional variables that influence the final decision to drop out (García and Adrogué, 2015). Most impact scientific research has focused on variables such as students' academic and professional expectations (Díaz et al., 2019),

integration into their new educational environment (Bernardo et al., 2016), socioeconomic circumstances of the students and their families (Sosu and Pheunpha, 2019), and finally the academic performance. This is one of the most prominent variables in the scientific literature (Gutierrez et al., 2015).

2.2. Dropout prevention and strategies from school to higher education

Given the high dropout rates at universities, many schools and faculties have adopted and implemented various dropout prevention strategies and programs. This topic has been studied for the last two decades and numerous plans and programs have been proposed, in addition to other types of avenues being explored to curb the problem.

Many of these programs have been developed to anticipate the key to student dropout and poor or non-attendance. However, in the literature, the authors are those who priorities addressing these issues before arrival in the classroom or at the beginning of higher education, where such tests are very effective and give results that show a reduction in dropout rates in students. On the other hand, more personalized tests have been proven to be more successful in the long term (Cerda-Navarro et al., 2017).

Other ways suggested by the authors Huntington and Gill (2020), are to reduce drop-out rates among students by tutoring them in those subjects that best suit their potential. Thus, offering them greater counseling for those who want it.

On the other hand, several authors argue that such monitoring should be considered before students reach higher education, creating, and attempting to remedy dropout by early identification of any factors associated with the potential for dropout.

"Through personalization of education, teachers and the academic body as a whole must work together to increase the chances of success in students' academic pursuits while creating a supportive and caring learning environment" (Cholewa and Ramaswami, 2015, p. 206).

This would not only involve the student, but also implies that teachers help in the resolution of personal problems they may face. These solutions also lie with the family (Terry, 2008), where good family support and family involvement are key determinants of the choices students make. Poor support from teachers or parents often encourages students' disdain and increases their willingness to drop out of school.

3. Objectives

In view of the above, the following objectives are proposed:

3.1. To identify the different factors that cause university drop-outs by using new technologies and by looking at the literature and scientific databases.
3.2. Determine the most appropriate authors on the topic of university dropout using scientific literature and different databases.

Permanence in the degree

(Graph showing Permanence in the degree with Graduates and Students bars for categories 1-16)
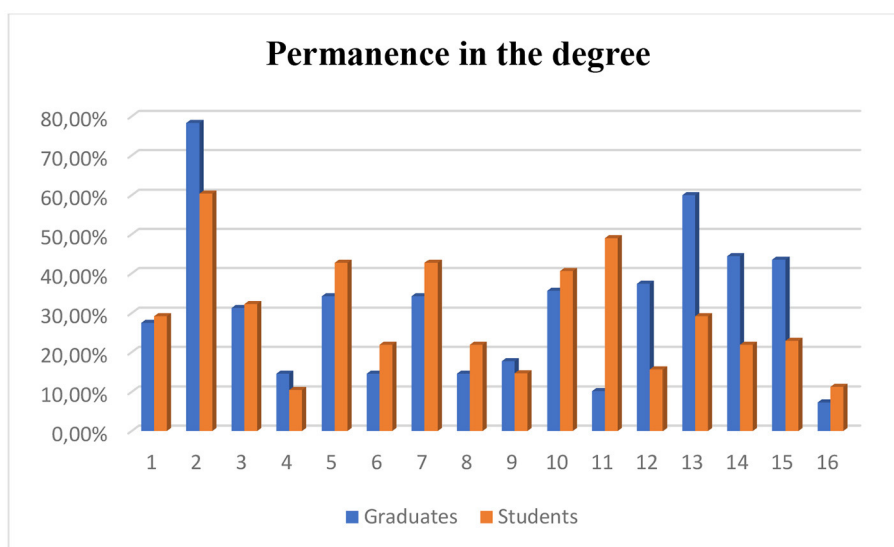
FIGURE 5
Reason for remaining in university studies.

University dropout

(Graph showing University dropout with ERIC, WOS, Google Scholar bars for years 2018-2022)
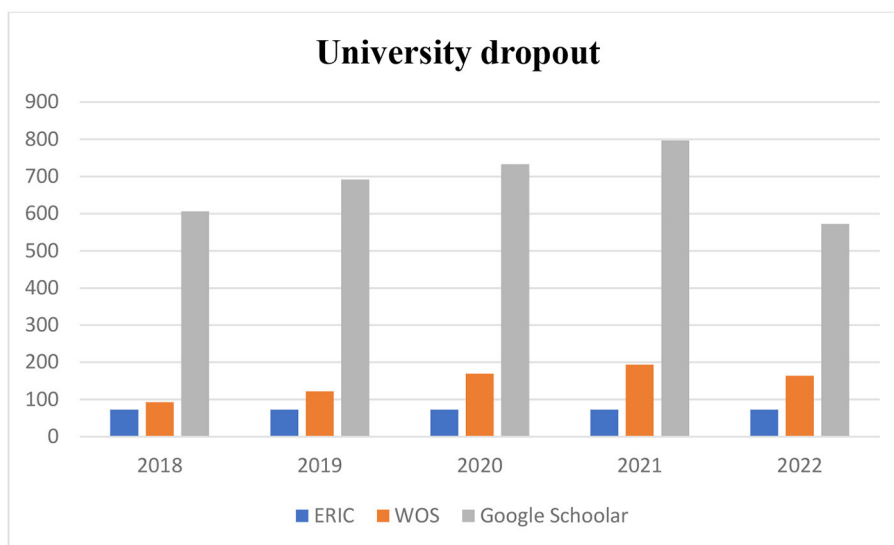
FIGURE 6
Keyword.

4. Materials and methods

In line with the aim of the project and the objectives pursued, this study attempts to respond to both basic research parameters (identifying, analyzing, and explaining teachers' training itineraries, their projection toward reducing dropout, and connection with digital competence and ICT use), and applied research (creation of digital tools and contents and elaboration of recommendations and proposals for training with a transnational perspective and ICT use).

The following questions have been used as a starting point to determine the goals of the review:

What are the causes of university dropout?
What instruments are needed to collect this information?

A period of the last 5 years, from 2018 to 2022, inclusive, has been considered in order to observe the different tools used.

The research was carried out using the Web of Science digital platform; ERIC, as the database specializing in education; and following Wu and Sarker (2022) the database Google Scholar was also used. The key words that guided the review were those associated with university dropout (Table 1).

The search was carried out with the aim of narrowing down, the following inclusion criteria were taken into account:

1. Papers published between 2018 and 2022.
2. Quantitative, qualitative, or mixed studies.
3. Articles in English or Spanish.
4. Full text available.
5. Directly related to the research objective, i.e., including one or more search terms related to the questions posed in the planning phase.
6. Open access.

With these criteria, the information was filtered, discarding articles that did not contain information related to the object of study. Figure 3 shows the flow chart of the search and selection process following the PRISMA guidelines, the purpose of which was to ensure transparency and clarity.

5. Results

The results of the research are presented below, firstly quantitative and then qualitative, based on the answers to the questions posed above. Following the proposed methodology, the most recent articles were selected, classified, and organized in a matrix where the most relevant information was included. The following figure shows the annual distribution of the selected articles.

As can be seen in Figure 4, the importance that this construct has been gaining over the years is notorious, especially in 2021, with a quite noticeable increase, so it can be seen how in the different databases its research has been growing and therefore, the consideration given to this topic.

On the other hand, the information extraction procedure involved a reading of the articles to determine their contribution to the resolution of the research questions in order to compare them qualitatively (Okoli and Schabram, 2010).

The data that can be visualized in Figure 5 explain some of the reasons that led students who were studying for a degree in Primary Education and students who had completed their studies to consider abandoning their studies at some point during their studies. This is worrying data that allows us to foresee and investigate further into the main reasons for dropping out. In this review, they all agreed on three main reasons: lack of interest, lack of motivation of the students themselves. On the other hand, there are reasons such as the university career itself or lack of time.

As can be seen in Figure 6, the results obtained from the thematic content were based on a keyword, "university dropout," which has been filtered using the guidelines mentioned above, in order to have a better selection of articles and studies. In the figure, we can see how by introducing the keyword, several studies appear, highlighting the increase in the year 2021, in all the databases collated. Three databases, ERIC, Web of Science (WOS), and Google Scholar, have been considered for the search.

6. Discussion

Several authors have attempted to link psychological and social factors. Fall and Roberts (2012) unified these factors

TABLE 2   Data collection instruments.

Instruments for data collection	
Collection instruments scientific	**Interviews**: qualitative interviews. The individual interviews will be semi-structured, biographical, in-depth, and will be recorded on a tape recorder. Electronic support.
	As for the group interview, they are applied to groups of the collectives (community The study of the role of the university, families, school, dropout students), allowing to reveal meanings that only emerge in the realm of debate and negotiation of meanings.
	Questionnaires: the questionnaire on student drop-out (desertion) and retention, resulting from an adaptation of Chain's (1995) questionnaire on university students and school trajectories. It consists of 59 items grouped into five information-gathering sections and also incorporates indicative information on its objective and response procedure.
Technological instruments	**Survey monkey**: based on enterprise data collection and analysis solutions for use on Android and iOS computers and mobile devices to manage data on university drop-outs.
	In addition to all this, a specific social network has been created for communication Instruments between participants, a dynamic website has been created and is operational, statistics and cartographies have been created, and curricular digital content has been created for the improvement of the teacher training in digital competence and ICT

through a model for developing higher student motivation called "*Self-System Mode of Motivational Development*" (SSMMD). This theory integrates social factors, such as the support students have from their parents and teachers, which are determining factors in students' decisions to drop out of school.

Likewise, it has been observed in several studies that support from family, teachers, and the institution itself is often one of the reasons why students regain their motivation, even when they have academic difficulties, reducing dropout levels in institutions (Martínez and Álvarez, 2005; Fall and Roberts, 2012).

It is interesting to note that factors such as self-esteem and self-concept that led to school failure (frustration) or absenteeism are important for the aforementioned psychological variables, which according to several studies are directly related to student dropout (Martínez and Álvarez, 2005; Barbero, 2016).

On the other hand, it is necessary to highlight those factors that depend on the institution, factors related to all those supports that accompany the student in the course of their education. To curb university dropout, institutions have addressed several strategies, one of which is the systematic monitoring of the characteristics and performance of students (Munizaga, 2018), accompanying them in their process with devices for higher education. Such initiatives are intended to reduce dropout rates and increase retention rates.

In a study carried out at the University of Valencia (Chiva et al., 2016), they suggest that students' satisfaction with their Bachelor's Degrees in Education is due to the changes that the institutions have made to improve their degree, those related to the provision of information and knowledge of the professional opportunities available to them.

7. Conclusions

The main conclusions of this research are, firstly, that the main causes are due to the most personal aspects of the students themselves. These causes involve psychological and social factors, such as stress, anxiety, frustration and demotivation, socio-economic level, socio-family context, and personal factors, including institutional factors. These are the reasons why thousands of students around the world often drop out of their studies.

In this sense, it is understood that psychological factors prevail in the causes of dropout, whether due to a poor adaptation to university or to the difficulty involved in the degree studied by the student. Another of the reasons why students are discouraged and frustrated is due to their own perception of themselves, their sociability with the university community, where some, even though they have had a period of adaptation, have not managed to integrate into university life, which leads them to decide to abandon their studies.

Finally, it should be noted that most students, despite these types of characteristics associated with dropping out, have good impressions of the degrees they have studied. These reasons are encouraged by the students' own expectations, interests, needs, and demands, as they understand that the institutions meet the expectations and educational quality that they themselves demand and need for their adequate training.

In this way, by reiterating the motivation of the students, they are able to continue their studies and are more able to continue to hold on to the positive premises that their careers bring, both in terms of education and socio-economic future, and are motivated and motivated to continue their studies.

Supported by the institution itself and its environment, which encourages the retention of students for the completion of their degrees and decreasing the negative feelings that lead them to drop out of their studies.

Higher education is the engine of developed societies; therefore, the greatest contribution of this study is to provide an in-depth analysis of the variables involved in higher education dropout. This will help the agents involved in processes such as the creation and execution of strategies and policies to make the appropriate decisions to improve the situation regarding higher education.

8. Limitations and future perspectives

One of the limitations found in this study is the use of only one variable for the study. In future studies, it is intended to consider other types of variables in order to broaden the spectrum of the study of this topic and make it more complete.

The second limitation refers to the fact that this study refers to the linguistic immersion in the *Web of Science and Scopus databases*, although it is true that these two databases are extensive and cover many similar studies already related to the subject of the study, it would be advisable to explore other databases in order to make up for this limitation, in this sense and linking with future proposals, the exploration of other databases will be included in other similar research, in this way investigating more about university dropout at a national level and in foreign universities.

In addition, for future research, it is intended to collect empirical data that will provide an objective view of all these variables involved in university dropout. As can be seen in Table 2, there are different instruments that will be used for data collection. Therefore, one of the main limitations is that the meta-analysis has not been carried out. However, it will correspond to the future of this research, since at this moment it is in the theoretical conceptualization.

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.

Author contributions

OL-Q have searched the different databases to choose the articles that were most suitable for the research interest. AL-T made a selection of the best articles, already filtered, which were passed on to OL-Q and SG-L, who were in charge of their analysis. SG-L was in charge of producing the different figures and tables. AL-T worked on the discussions and conclusions. SG-L worked on the limitations and future perspectives, and finally OL-Q finished with a final revision of the manuscript and its translation into English. All authors contributed to the article and approved the submitted version.

Funding

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.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

Abbate, J. (2008). Admission, support and retention of non-traditional students in university careers. *Rev. Electr. Iberoam. Calid. Efic. Camb. Educ.* 6, 7–35.

Agudo, J. C. (2017). Can MOOCs favour learning by decreasing university dropout rates? *Rev. Iberoam. Educ. Dist.* 20, 125–142.

AIReF (2020). *Study of the Andalusian Public University System.* Independent Authority for Fiscal Responsibility.

Al Ghanboosi, S., and Alqahtani, A. (2013). Student drop-out trends at Sultan Qaboos University and Kuwait University: 2000–2011. *Coll. Stud. J.* 47, 499–506.

Álvarez, D. (2021). Analysis of university dropout in Spain: a bibliometric study. *Publicaciones* 51, 241–261. doi: 10.30827/publicaciones.v51i 2.23843

Aries, E., and Seider, M. (2005). The interactive relationship between class identity and the college experiencie: the case of lower income students. *Qual. Sociol.* 28, 419–443. doi: 10.1007/s11133-005-8366-1

Ariño, A., and Llopis, R. (2011). *University Without Classes? Living Conditions of University Students in Spain (Eurostudent IV).* Available online at: https://sede. educacion.gob.es/publiventa/d/14909/19/0 (accessed January 18, 2023).

Barbero, N. (2016). *Factores Psicológicos del Adolescente y su Incidencia en el Abandono Escolar.* Master Thesis, Universidad Nacional de Educación a Distancia, (Spain), Facultad de Educación. Department of Theory of Education and Social Pedagogy. Available online at: http://e-spacio.uned.es/fez/view/bibliuned:master-Educacion-~IntConSoc-Nbarbero (accessed January 18, 2023).

Bernardo, A., Cervero, A., Esteban, M., Fernández, E., and Núñez, J. C. (2016). Influencia de variables relacionales y de integración social en la decisión de abandonar los estudios en Educación Superior. *Psicol. Educ. Cult.* XX, 138–151.

Cabrera, A. F., Pérez, P., and López, L. (2014). "Evolution of perspectives on the study of university retention in the USA: conceptual bases and turning points," in *Persisting with Success at University: From Research to Action,* Coord. P. Figuera (Laertes), 15–40.

Carrera, B., and Mazzarella, C. (2001). Vygotsky: sociocultural approach. *Educere* 5, 41–44.

Castaño, E., Gallón, S., Gómez, K., and Vásquez, J. (2008). Analysis of the factors associated with student dropout in Higher Education: a case study. *Rev. Educ.* 345, 255–280.

Castejón, A., Ruiz, M., and Arriaga, J. (2015). "Factors/profiles of the reasons for university dropout at the Polytechnic University of Madrid (paper). V CLABES," in *Fifth Latin American Conference on Dropout in Higher Education, University of Talca* (Chile).

Castejón, C., and Pérez, S. (1998). A causal-explanatory model on the influence of psychosocial variables on academic performance. *Bordón. J. Pedag.* 2, 170–184.

Castillo, M. (2010). Desertion at university level. *Ensay. Pedagóg.* 5, 37–56. doi: 10.15359/rep.5-1.2

Cerda-Navarro, A., Sureda-Negre, J., and Comas-Forgas, R. (2017). Recommendations for confronting vocational education dropout: a literature review. *Empirical Res. Voc. Ed. Train* 9, 17. doi: 10.1186/s40461-01 7-0061-4

Chain, R. (1995). *Estudiantes universitarios: Trayectorias escolares.* México: Universidad Veracruzana-Universidad Autónoma de Aguascalientes.

Chiva, I., Ramos, G., and Moral, A. M. (2016). Analysis of the satisfaction of the students of the degree of Pedagogy of the Universitat de València. *Rev. Complut. Educ.* 28, 755–772. doi: 10.5209/rev_RCED.2017.v28.n 3.49831

Cholewa, B., and Ramaswami, S. (2015). The effects of counseling on the retention and academic performance of underprepared freshmen. *J. Coll. Stud. Reten. Res. Theory Pract.* 17, 204–225. doi: 10.1177/1521025115578233

Coromínas, E. (2001). The transition to university studies. Dropout or change in the first year of university. *Rev. Invest. Educ.* 19, 127–151.

CRUE (2016). *Spanish Universities in Figures 2014–2015.* Available online at: http://www.crue.org/SitePages/La-Universidad-Espa%C3%B1ola-en-Cifras.aspx (accessed January 18, 2023).

De Vries, W., León, P., Romero, J., and Hernández, I. (2011). Dropouts or disappointed? Different causes for dropping out of university studies. *J. High. Educ.* 40, 29–49.

Díaz, A., Pérez, M. V., Gutiérrez, A. B. B., Fernández-Castañón, A. C., and González-Pienda, J. A. (2019). Affective and cognitive variables involved in structural prediction of university dropout. *Psicothema* 31, 429–436. doi: 10.7334/psicothema2019.124

Doerschuk, P., Bahrim, C., Daniel, J., Kruger, J., Mann, J., and Martin, C. (2016). Closing the gaps and filling the STEM pipeline: a multidisciplinary approach. *J. Sci. Educ. Technol.* 25, 682–695. doi: 10.1007/s10956-016-9622-8

Duque, L. C., Duque, J. L., and Surinach, J. (2013). Learning outcomes and dropout intentions: an analytical model for Spanish universities. *Educ. Stud.* 39, 261–284. doi: 10.1080/03055698.2012.724353

Elias, M. (2008). University dropouts: challenges facing the European Higher Education Area. *Estud. Sob. Educ.* 15, 101–121.

Esteban, M., Bernardo, A., Tuero, E., Cervero, A., and Casanova, J. (2017). Influential variables in academic progress and permanence at university. *Eur. J. Educ. Psychol.* 10, 75–81. doi: 10.1016/j.ejeps.2017.07.003

Estrada, H., De la Cruz, S., Bahamón, M., Perez, J., and Caceres, A. (2017). Burnout académico y su relación con el bienestar psicológico en estudiantes universitarios. *Revista Espacios.* 39, 1–17. Available online at: https://n9.cl/4engq

Eurostat (2020). *Tertiary Education Statistics.* Available online at: https://ec.europa.eu/eurostat/statisticsexplained/index.php?title=Tertiary_education_statistics (accessed January 18, 2023).

Evers, F., and Mancuso, M. (2006). Where are the boys? Gender imbalance in higher education. *High. Educ. Manage. Policy* 18, 71–84. doi: 10.1787/hemp-v18-art15-en

Fall, A. M., and Roberts, G. (2012). High school dropouts: interactions between social context, self-perceptions, school engagement, and student dropout. *J. Adolesc.* 35, 787–798. doi: 10.1016/j.adolescence.2011.11.004

Fonseca, G., and García, F. (2016). Permanence and dropout in university students: an analysis from organizational theory. *Rev. Educ. Super.* 45, 25–39. doi: 10.1016/j.resu.2016.06.004

Gairín, J., Muñoz, J. L., Galán, A., Sanahuja, J. M., and Fernández, M. (2013). Tutorial action plans for students with disabilities: a proposal to improve the quality of training in Spanish universities. *Rev. Iberoam. Educ.* 63, 115–126. doi: 10.35362/rie630504

Garbanzo, G. M. (2007). Factors associated with academic performance in university students, a reflection from the quality of public higher education. *Rev. Educ.* 31, 43–63.

García de Fanelli, A. M. (2014). Academic performance and university dropout. Models, results and scopes of academic production in Argentina. *Rev. Argent. Educ. Super.* 8, 9–38.

García, A. (2014). Rendimiento académico y abandono universitario: Modelos, resultados y alcances de la producción académica en la Argentina. *Revista Argentina de Educación Superior.* 6, 9–38.

García, A., and Adrogué, C. (2015). Abandono de los estudios universitarios: dimensión, factores asociados y desafíos para la política pública. *Rev. Fuent.* 16, 85–106. doi: 10.12795/revistafuentes.2015.i16.04

González, M., Álvarez, P., Cabrera, L., and Bethencourt, J. (2007). Dropping out of university studies: determinants and preventive measures. *Rev. Españ. Pedag.* 236, 71–86.

Gury, N. (2011). Dropping out of higher education in France: a micro-economic approach using survival analysis. *Educ. Econ.* 19, 51–64. doi: 10.1080/09645290902796357

Gutierrez, B., Cerezo, R., Rodríguez, L., Nuñez, J., Tuero., E., and Esteban, M. (2015). Predicción del abandono universitario: variables explicativas y medidas de prevención. *Revista Fuentes.* 16, 63–84. doi: 10.12795/revistafuentes.2015.i16.03

Hernández-Jiménez, M. T., Moreira, T. E., Solís, M., and Fernández, T. (2020). Descriptive study of socio-demographic and motivational variables associated with dropout: the perspective of first-time university students. *Rev. Educ.* 44, 1. doi: 10.15517/revedu.v44i1.37247

Himmel, E. (2018). Model for analysing student dropout in higher education. *Qual. Educ.* 17, 91–108.

Huntington, N., and Gill, A. (2020). Semester course load and student performance. *Res. High. Educ.* 62, 623–650. doi: 10.1007/s11162-020-09614-8

Íñiguez, T., Elboj, C., and Valero, D. (2016). The University of the European Higher Education Area in the face of undergraduate dropout. Causes and strategic proposals for prevention. *Educ.* 52, 285–313. doi: 10.5565/rev/educar.674

Jacob, B. A. (2002). Where the boys aren't: non-cognitive skills, returns to school and the gender gap in higher education. *Econ. Educ. Rev.* 21, 589–598. doi: 10.1016/S0272-7757(01)00051-6

Jones-White, D. R., Radcliffe, P. M., Lorenz, L. M., and Soria, K. M. (2014). Price out? The influence of financial aid on the educational trajectories of first-year students starting college at a large research university. *Res. High. Educ.* 55, 329–350. doi: 10.1007/s11162-013-9313-8

Lázaro, A. (2003). "Tutorial competences at the University," in *La Tutoría y los Nuevos Modos de Aprendizaje en la Universidad,* eds F.F. Michavila Pitarch and J. García Delgado (Comunidad de Madrid: Consejería de Educación), 107–128.

Lehmann, W. (2007). "I just didn't feel like I fit in": the role of habitus in university drop-out decisions. *Canad. J. High. Educ.* 37, 89–110. doi: 10.47678/cjhe.v37i2.542

Long, M., Ferrier, F., and Heagney, M. (2006). *Stay, Play or Give It Away? Student Continuing, Changing or Leaving University Study in First Year.* Australian Government Department of Education Science and Training.

Lorenzo, O. (2021). *Professional Insertion and Graduate Follow-Up. A Multicultural Perspective.* Madraid: Síntesis.

Lorenzo, O., and Zaragoza, J. E. (2010). Exploratory study on university student dropout in Mexico. *Publicaciones* 40, 109–123.

Lydner, K. (2022). *Drop.Out Prevention and Strategies to Help Special Education Students. Higher Education in Caulfield School of Education.* Doctoral Thesis, Saint Peter's University.

Marchesi, A. (2000). A system of indicators of educational inequality. *Rev. Iberoam. Educ.* 23, 1–22. doi: 10.35362/rie2301009

Martínez, M. (1999). El enfoque sociocultural en el estudio del desarrollo y la educación. *Rev. Electrón. Invest. Educ.* 1, 1.

Martínez, R. A., and Álvarez, L. (2005). Fracaso y abandono escolar en Educación Secundaria Obligatoria: implicación de la familia y los centros escolares. *Aula Abierta* 85, 127–146.

MDSyF (2003). *CASEN Survey.* Available online at: http://observatorio.ministeriodesarrollosocial.gob.cl/casen/casen_obj.php (accessed January 18, 2023).

MEFP (2019). *Basic Data of the Spanish University System: Academic Year 2018–2019.* MEFP.

Merlino, A., Ayllón, S., and Escanés, G. (2011). Variables that influence the dropout of first-year university students. Construction of dropout risk indexes. *Actual. Invest. Educ.* 11, 1–30. doi: 10.15517/aie.v11i2.10189

Meyer, T., and Thomsen, S. L. (2018). The role of high-school duration for university students' motivation, abilities and achievements. *Educ. Econ.* 26, 24–45. doi: 10.1080/09645292.2017.1351525

Mori, M. D. P. (2012). University dropout in students of a private university of Iquitos. *Rev. Digit. Invest. Docen. Univ.* 6, 60–83.

Munizaga, M. F. (2018). *Retención y abandono estudiantil en la educación superior universitaria en América Latina* (Doctoral thesis). Available online at: https://repositorio.uchile.cl/handle/2250/187777

Nieman, M. M. (2013). South African student's perceptions of the role of a gap year in preparing them for higher education. *Afr. Educ. Rev.* 10, 132–147. doi: 10.1080/18146627.2013.786880

OECD (2010). *Education at a Glance 2010: OECD Indicators.* Available online at: https://sede.educacion.gob.es/publiventa/d/14340/19/1 (accessed January 18, 2023).

OECD (2017). *Education at a glance 2017: OECD Indicators.* Available online at: https://www.mecd.gob.es/dctm/inee/eag/2017/panorama-de-la-educacion-2017-def-12-09-2017red.pdf?documentId=0901e72b8263e12d (accessed January 18, 2023).

OECD (2019). Education at a glance 2019. *OECD Indicators.* doi: 10.1787/f8d7880d-en

Okoli, C., and Schabram, K. (2010). A guide to conducting a systematic literature review of information systems research. *Sprouts Work. Pap. Inform. Syst.* 10, 26. doi: 10.2139/ssrn.1954824

Ononye, L. C., and Bong, S. (2018). The study of the effectiveness of scholarship grant program on low-income engineering technology students. *J. STEM Educ. Innov. Res.* 18, 26–31.

Pedraza, I. (2021). *Mediation Processes Associated with University Dropout: A Study from a Sociocultural Approach.* Unpublished doctoral thesis, University of Seville, Spain.

Planas, J. A., Prieto, J., and Lizandra, R. (2011). *The Tutorial Action Plan [Paper].* Master's Degree in Intervention and Psychopedagogical Counselling for Professionals, Autonomous University of Barcelona, Spain.

Polumbo, B. (2017). *Up To 60 Percent of College Students Need Remedial Classes. This Needs To Change Now.* Available online at: https://thefederalist.com/2018/09/18/60-percent-college-students-need-remedial-classes-needs-change-now/ (accessed March 3, 2023).

Project Alpha Guide, DCI-ALA/2010/94 (2013). *Collective Construction of the Concept of Dropout in Higher Education for its Measurement and Analysis.* Available online at: http://www.alfaguia.org/www-alfa/index.php/es/invest-abando/marcoconceptual.html (accessed January 18, 2023).

Puertas Cañaveral, I. C., and De Oliveira Sá, T. A. (2017). REUNI: Expansão, segmentação e a determinação institucional do abandono. *Estudo de caso na Unifal-M. EccoS . Revista Cient?fica.* 44, 93–115. doi: 10.5585/EccoS.n44.7899

Rodriguez, L. F. (2013). El enfoque PUEDES: un paradigma para comprender y responder a la crisis de deserción escolar/expulsión de las latinas del siglo XXI en los EE. UU. *J. Crit. Thought Praxis.* 2.

Rodríguez-Pineda, M., and Zamora-Araya, J. A. (2020). Early dropout in university students: a cohort study on its possible causes. *Uniciencia* 35, 19–37. doi: 10.15359/ru.35-1.2

Sacristán, V. (2018). Fee hikes push students out of university. *El Periódico.* Available online at: https://www.esteve.org/en/publicaciones/la-subida-de-tasasexpulsa-a-los-estudiantes-de-la-universidad/ (accessed March 3, 2023).

Severiens, S., and Dam, G. (2012). Leaving college: a gender comparison in male and female-dominated programs. *Res. High. Educ.* 53, 453–457. doi: 10.1007/s11162-011-9237-0

Sevilla, D. D. S., Puerta, V. A., and Dávila, J. (2010). Influence of socioeconomic factors on student attrition in the social sciences. *J. Intersci. Intercult. Dial.* 6, 72–84. doi: 10.5377/rci.v6i1.282

Silver Wolf, D. A. P., Perkins, J., Butler-Barnes, S. T., and Walker, T. A. (2017). Social belonging and college retention: results from a quasi-experimental pilot study. *J. Coll. Stud. Dev.* 58, 777–782. doi: 10.1353/csd.2017.0060

Sosu, E., and Pheunpha, P. (2019). Trajectory of university dropout: investigating the cumulative effect of academic vulnerability and proximity to family support. *Front. Educ.* 4, 6. doi: 10.3389/feduc.2019.00006

Spady, W. (1970). Dropout from Higher Education: an interdisciplinary review and synthesis. *Interdiange* 1, 64–85. doi: 10.1007/BF02214313

Stephens, N. M., Markus, H. R., Fryberg, S. A., Johnson, C. S., and Covarrubias, R. (2012). Unseen disadvantage: how American universities' focus on independence undermines the academic performance of first-generation college students. *J. Pers. Soc. Psychol.* 102, 1178–1197. doi: 10.1037/a0027143

Tejedor, F., and García-Valcárcel, A. (2007). Causes of low university student performance (in the opinion of teachers and students). Proposals for improvement in the framework of the EHEA. *Rev. Educ.* 342, 443–473.

Terry, M. (2008). The effects that family members and peers have on students' decisions to drop out of school. *Educ. Res. Quart.* 31, 25–38.

Tinto, V. (1987). *The Principles of Effective Retention.* Paper presented at the Fall Conference of the Maryland College Personnel Association.

Torres, I. S. (2018). "Longitudinal study Permanence and dropout in university students (2015–2019) [paper]," in *VIII CLABES. Eighth Latin American Conference on Dropout in Higher Education, Universidad Tecnológica de Panamá* (Panama).

Turienzo, R. (2016). *El Pequeño Libro de la Motivación.* Barcelo, Grupo planeta.

Vera, G. G., and Álvarez, M.I. (2022). Motivation and student desertion in technological institutes of higher education in Guayaquil. *Polo Conocim.* 7, 2078–2097. doi: 10.23857/pc.v7i6.4182

Viale, H. (2014). *Una aproximación teórica a la deserción estudiantil universitaria.* Revista Digital de Investigación en Docencia Universitaria. p. 1. doi: 10.19083/ridu.8.366

Weinstock, C. P. (2017). *Depression in Late Teens Linked to High School Dropout.* Reuters Health. Available online at: https://www.reuters.com/article/us-health-teens-depressiondropouts-idUSKBN1E22RA

Wu, M., and Sarker, M. N. I. (2022). Assessment of multiple subjects' synergetic governance in vocational education. *Front. Psychol.* 13, 947665. doi: 10.3389/fpsyg.2022.947665

Corrigendum: Factors contributing to university dropout: a review

Oswaldo Lorenzo-Quiles ⓘ *, Samuel Galdón-López ⓘ and
Ana Lendínez-Turón ⓘ

Faculty of Education and Sports Sciences, University of Granada, Melilla, Spain

A corrigendum on

Factors contributing to university dropout: a review

by Lorenzo-Quiles, O., Galdón-López, S., and Lendínez-Turón, A. (2023). *Front. Educ.* 8:1159864. doi: 10.3389/feduc.2023.1159864

In the published article, there was an error in the article title. Instead of "Dropout at university. Variables involved on it", it should be "Factors contributing to university dropout: a review".

In the published article, there was an error in the Funding statement. The correct Funding statement appears below.

"This study has been carried out within the framework of the project ICT Innovation for the analysis of the training and satisfaction of students and graduates of early childhood and primary education and the assessment of their employers. A transnational perspective (INNOTEDUC). Reference B-SEJ-554-UGR20 (2021-2023), financed by the Operational Programme Andalusia FEDER 2014-2020 (Proyects I+D+I). Consejería de Universidad, Investigación e Innovación de la Junta de Andalucía (Spain)."

The authors apologize for this error and state that this does not change the scientific conclusions of the article in any way. The original article has been updated.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Check for updates

Dropout stories of Andalusian university students

José Gijón[1], Meriem K. Gijón[2], Pablo García[1] and
Emilio J. Lizarte[1]*

[1]Department of Didactics and School Organization, University of Granada, Granada, Spain, [2]Laboratory
for Cognition, Health, Training and Interaction Among Humans, Animals and Machines, University of
Granada, Granada, Spain

The abandonment of university studies is a problem that affects the balance and correct organization of university systems throughout the world and that has undesirable personal consequences in advanced societies. Dropping out of school has a multidimensional explanation. Among the causes, associated with each other, that originate it, the following factors stand out: psychological, social, economic, psycho-pedagogical, institutional, and didactic. Studying how all these dimensions act and relate to each other in specific cases of people who drop out of Higher Education, helps us to better understand the phenomenon and to develop prevention measures in university institutions. This text presents the results of biographical-narrative research carried out among the student population in a situation of abandonment of the universities of Andalusia that has allowed us to recover 22 stories of abandonment carried out by as many ex-students who were enrolled in any of the nine universities. Andalusians publish in any of the different university degree studies. The biographical texts have been subjected to narrative analysis to achieve personal exemplifications and characterize paradigmatic cases of relationship between the dimensions of the problem, using concept mapping to present the outcomes.

1. Introduction

There is great international concern about student retention in higher education institutions, especially in recent years (Foster and Francis, 2020; Casanova et al., 2021), being also a concern for Spain and its universities (Lizarte, 2017a, 2020; Lizarte and Fernández, 2020). Dropout undoubtedly occurs as an interconnected result of social, family, economic and personal factors that students experience when they abandon their university studies, and it needs to be analyzed in terms of the specific geographical and socio-economic contexts. For example, in the context of the European Higher Education Area (EHEA), which includes Spain, the opening up of areas of free movement of workers and the transparency and transferability of university degrees is also a factor that has generated a global adaptation of the university system, of its organization in the European Credits Tansfer System (ECTS) credit system, and of the teaching methodologies appropriate for competence-based training (Gijón Puerta and Crisol Moya, 2012; Lizarte and Gijón, 2019).

Early dropout affects all areas of knowledge and all higher education institutions, both public and private. Its influence on the survival of university institutions is also high – especially in private institutions – and it occupies the education policy agendas of developed countries and

emerging economies. In the case of the European Union, the so-called 2030 Agenda has set targets related to the reduction of early school leaving, as a generic concept in this case, comprising the population aged 18–24 who are not in or have dropped out of tertiary education.

In terms of university dropouts, the most recent data from the Spanish Ministry of Universities put the dropout rate at between 13 and 11% – for those under 30 years of age – of students at Spanish universities who entered in the 2015/16 academic year. These figures are like those of other OECD countries (Fernández Mellizo, 2022) and represent a strong negative impact on the quality of higher education. This study indicates as factors involved in early drop-out (between the first, second and third year for 4-year degrees), some family or individual factors, academic performance in the first year of the degree, tuition fees, age and socio-economic level. Courses requiring fewer qualifications for entry have higher drop-out rates, and the size of the university also seems to be related to drop-out rates (the larger the university, the higher the drop-out rate).

The international literature has progressively included different views on drop-out in higher education. For this reason, a brief terminological clarification is needed. Having a single definition of "University Desertion" is certainly complicated, as there are different perspectives on abandonment and multiple factors that can influence the decision to drop out. International literature provides various conceptualizations of the phenomenon of student abandonment, including terms such as desertion, retention and persistence (Bäulke et al., 2022) or procastination (Bäulke et al., 2021). These terms are defined differently, although they are sometimes used interchangeably. Generally speaking, "level of retention" refers to the rate at which students remain at a given institution, while "persistence" refers to the completion of a degree and the award of a qualification, irrespective of whether they have changed institution or degree.

Different authors have approached the concept of dropout from different perspectives. For example, González and Uribe (2002) has presented dropouts according to: their duration – temporary dropouts are called partial and permanent dropouts are called total – and according to whether they affect a university or the entire higher education system – institutional dropouts are associated with a single institution, and systemic dropouts when they involve leaving higher education for good. –.

In relation to the point in time at which desertion occurs, the threshold applied varies: from using the time of desertion regardless of when it occurs, to using 3, 2, or 1 year desertion data (Fernández Mellizo, 2022). In this sense, a large part of the studies on dropout have agreed that university dropout occurs mainly in the first year (Corominas Rovira, 2001; Pierella et al., 2020; Wild and Heuling, 2020). The first weeks of school are decisive because there is a higher risk of dropping out due to the multitude of internal and external factors that intervene in the course of adaptation, which is more accentuated among students with lower degrees of self-perception and regulation in psychosocial and academic areas (Lizarte Simón and Gijón Puerta, 2022).

Tinto (1982) defines dropout as a situation faced by a student who aspires to and fails to complete his or her educational project at university, and a dropout as a student who has no academic activity for three consecutive semesters. We will use this concept of "desertion," focusing on university drop-out in the first and second year of a degree programme.

The literature of the last four decades has generated very different explanatory models of the process of student drop-out in higher education. Since the 1960s, a wide variety of models have been developed to try to explain dropout in higher education, which are grouped into different perspectives: psychological, sociological, structural and organizational, adaptation (integration), psycho-pedagogical, structural perspective, adaptation (integration), ability to pay, or link, nexus and university choice (Berlanga et al., 2018; see Figure 1).

Based on recent reviews of the existing literature on explanatory models of dropout (Figuera Gazo and Torrado Fonseca, 2012; Torrado Fonseca, 2012; Berlanga et al., 2018; Torrado Fonseca and Figuera Gazo, 2019) it is possible to establish the existence of a solid body of doctrine on dropout in higher education. The Student Integration Model developed by Spady (1970), Tinto (2010), and do Nicoletti (2019), and Bean's Student Attrition Model (Bean and Metzner, 1985) will be the two basic models from which the research on dropout, integration, attrition and dessertion has been developed in higher education, organized around several factors that each model structures differently.

Irrespective of the models we select, several factors related to dropout in higher education are recurrent. Thus, based on the work of Lizarte and other authors in the international sphere (Lizarte, 2017b, 2020; Barroso et al., 2022; Lizarte Simón and Gijón Puerta,

Type of explanatory models of dropout	Related authors
Psychological models	Fishbein & Ajzen (1975)
	Eccles et al. (1983)
	Attinasi (1986)
	Eaton & Bean (1988)
	Ethington (1990)
	Peterson (1993)
	Napoli & Wortman (1998)
	Perry, Cabrera, & Vogt (1999)
	Eccles & Wigfield (2002)
Sociological models	Spady (1970)
Economic models	Schultz (1961)
	Becker (1962, 1964)
	Thurow (1973)
	Albert & Toharia (2000)
	John, Cabrera, Nora y Asker (2000)
Organisational models	Feldman (1989)
	Pascarella & Terenzini (1991)
	Kirton (20000)
	Wasserman (2001)
Psycho-pedagogical models	Ryan & Glenn (2003)
	Álvarez, Bethencourt, Cabrea, & González (2005)
	Henderson & Milstein (2005)
	Yip & Chung (20005)
Models from a structural perspective	Luján & Resendiz (1991)
	Thomas (2002)
Adaptation models (Integration)	Spady (1970)
	Tinto (1975, 1987, 1989, 1993, 2005, 2008)
	Nye (1979)
	Pace (1979, 1984, 1992)
	Bean & Vesper (1990)
	Cabrera, Nora, & Castañeda (1992, 19993)
	Nora & Cabrera (1996)
	Pascarella & Terenzini (1995)
	Metzner (2002)
	Landry (2003)
	Langley (2004)
	Girola (2005)
	Torrado (2012)
	Figuera & torrado (2013)
Ability-to-pay models	Cabrera, Stampen & Hansen (1990)
	Nora (1990)
	Cabrera, Nora & Castañeda (1992, 1993)
Linkage or nexus or university choice models	St. John et al. (1994)
	St. John, Paulsen, & Starkey (1996)
	Paulsen, & St. John (1997)

FIGURE 1
Dimensions grouping the explanatory models of dropout and authors related to each dimension. From Berlanga (2014).

2022) we can establish a set of factors related to early dropout in higher education, which will allow us to organize the narrative data that we will obtain from the application of in-depth interviews, as detailed in the methodological section. In Figure 2 we present the most relevant factors from the literature (Berlanga et al., 2018; Barroso et al., 2022), grouped into dimensions: (a) Biographical and socio-demographic attributes; (b) Self-perceptions prior to entry; (c) Goals and commitment; (d) Experiences in the institution; (e) and academic and social integration.

Regardless of the explanatory models of dropout, there are several strategies that universities carry out to overcome dropout, but there are no general protocols to prevent it (Lizarte Simón and Gijón Puerta,

2022). Based on the latest reports from various Andalusian universities, the creation of Guidance Units at the faculties is presented as one of the aid plans that best works avoid cases of abandonment. Orientation is part of the educational process and has become an indicator of the quality and functioning of university systems (Vidal et al., 2002).

As an example, we present the Guidance Unit of the Faculty of Educational Sciences of the University of Granada (Villena et al., 2013), whose most relevant tasks can be grouped into three categories: (a) Care program to the Baccalaureates (reception and attention of Baccalaureate students in the faculty, organizing open days, attention to counselors of Secondary Education Schools, or participation in

Dimension	Factor
Biographical and socio-demographic attributes	Family academic level (mainly mother or father)
	Family financial situation
	Sex (male / female)
	Mental health
	Stress level
	Type of secondary education attended (Baccalaureate, VET, etc.)
	Level of autonomy (personal, economic)
	University studies choice (reasons, decisions, etc.)
	Qualifications in Secondary Education
Self-perceptions prior to entry into university studies	Perception of control and academic competence
	Anxiety levels
Goals and commitment	Intention to drop out (influenced by attitude and self-efficacy)
	Internal vs. external motivation
	Goals in studies
	Initial expectations regarding the chosen university course of study
	Order of career choice
Experiences in the institution	Experiences according to the gender of the participant
	Number of credits enrolled and passed
	Entry age
	Scores obtained in university studies (mainly in technical and experimental science subjects)
	Failure in the first year of university studies
	Time spent studying
	Quality of interactions with teachers or fellow students
	Perceived support from teachers or fellow students
	Satisfaction with the institution
	Participation in academic and social groups (associations)
Academic and social integration	Scholastic Conscientiousness versus disorder
	Satisfaction with academic and social integration
	Learning strategies
	Time management
	Class attendance, satisfaction with courses and curriculum

FIGURE 2
Factors related to early dropout and their dimensions. Source from Berlanga (2014), Lizarte (2020), Barroso et al. (2022), and Lizarte Simón and Gijón Puerta (2022).

lectures at Secondary Education Schools); (b) Program of professional opportunities (general planning of activities on professional opportunities for the different degrees, organization of employment preparation workshops -preparation of the curriculum vitae, professional interview, information on jobs-); (c) Assistance program for students with disabilities (list of professors-tutors and students with specific educational support, information and awareness needs for the university community regarding university students with disabilities); (d) Support program for the tutorial function (planning and development of courses for teachers, teacher training, collaboration in the design of a Tutorial Plan, etc.).

2. Materials and methods

The abandonment of university studies is a problem that affects the balance and correct organization of university systems throughout the world and that has undesirable personal consequences in advanced societies. Dropping out of school has a multidimensional explanation. Among the causes, associated with each other, that originate it, the following factors stand out: psychological, social, economic, psycho-pedagogical, institutional, and didactic. Studying how all these dimensions act and relate to each other in specific cases of people who drop out of Higher Education, helps us to better understand the phenomenon and to develop prevention measures in university institutions (Figure 3).

The problem of university dropout affects all universities, although it occurs with different intensities –BBVA Foundation Report– (Pérez and Aldás, 2019). According to the U-Ranking – Spanish Universities report, the differences in dropout rates by region reach 19 percentage points in the case of bachelor's degrees and 13 points in the dropout rate of SUE (Spanish University System). The highest dropout rate by the regions is led by the Canary Islands with a value of 38.8%, while the lowest dropout rate is in Castilla y León with 19.6%. In the Andalusian case, the dropout rate stands at 28.5%.

The degree dropout rate by year of dropout and Andalusian university (Cohort 2012–2013) is Almería: 29.2%; Cadiz: 34.8%; Cordoba: 27.2%; Grenada: 27.2%; Huelva: 33%; Jaén: 29.7%; Malaga: 28.8%; Pablo de Olavide: 18.5%; Seville: 27.8%. As we can see, the Pablo de Olavide University presents the lowest dropout rate of the Andalusian universities with 18.5%; while the University of Cádiz presents the highest rate with 34.8%. The University of Granada presents a rate of 27.2%, which can be classified as a high rate.

There are several strategies that university institutions carry out to overcome the phenomenon of dropout, but there is no general

protocol for action in cases of possible dropout (Lizarte Simón and Gijón Puerta, 2022). Based on the latest reports from various Andalusian universities, the creation of Guidance Units in faculties is presented as one of the aid plans that work best to remedy cases of abandonment. Guidance is part of the educational process and has become an indicator of the quality and functioning of university systems (Vidal et al., 2002).This text presents the results of biographical-narrative research carried out among the student population in a situation of abandonment of the universities of Andalusia that has allowed us to recover 22 stories of abandonment carried out by as many ex-students who were enrolled in any of the nine universities. Andalusians publish in any of the different university degree studies. The biographical texts have been subjected to narrative analysis to achieve personal exemplifications and characterize paradigmatic cases of relationship between the dimensions of the problem, using concept mapping to present the outcomes.

Using NVivo® word frequency queries, we can list the words that occur most frequently in certain resources, in this case the transcripts of the interviews conducted. To refine the search, it has been screened by a minimum length of five letters, which is considered relevant for the Spanish language. Likewise, to avoid sterile repetition, derived words have been grouped and, finally, empty words (articles, prepositions, common verbs, etc.) have been eliminated. This query allows different visualizations: the branching map and the word cloud, which indicate – proportionally with the size – the presence of words; and the cluster analysis, which groups words according to their similarity of occurrence in the different files.

On the one hand, the word frequency query was used to: (a) Create a word cloud to visualize the concepts used in adequate proportion; (b) Define the general feeling that the process of making the abandonment decision linked to their biographical trajectory implied (self-coding by feelings); (c) Create a library of dropout-related keywords, which can serve as a basis for future discourse analysis of university dropout, using software such as Yoshikoder® (Lowe, 2006; automatic autocoding).

On the other hand, a direct narrative reconstruction of the CAB dimension (Causes of dropout) was carried out to establish the most frequently reported dropout factors and to compare them with those established in the literature review. The inductive categorization of the CON dimension (Suggestions and advice) was also carried out. The resulting information was reworked by the research team in a collaborative way, in the form of a narrative reconstruction of the causes of drop-out and in the form of a conceptual map. –*Concept Mapping* by Novak– (González García et al., 2013; Ibáñez et al., 2014), thus establishing a "knowledge model" generated with the key elements and their agreed relationships within the research team (González García et al., 2013) for the causes and advice that participating students give to participating institutions and other students.

The sample consisted of a total of 23 interviews. Sampling was criterion sampling, based on the subject's "accessibility" and acceptance of the research conditions. The demographic structure of the sample is presented in Figure 4, including 16 men and 7 women, students from the universities of Almeria, Cadiz, Granada, Cordoba, Jaen and Malaga, from careers related to experimental and biomedical sciences, social sciences, humanities and technical careers. The interviews were labeled with a number associated with the university where the dropout occurred AL01, CA01, GR01-03-04-05-06-07-09, JA01-02-03-04-06-07-08-09-10-11-12-13, MA02.

Dimension code	Description of the dimension
ANT	Family background at university
PRI	School history in pre-primary and primary school
SEC	School history in Compulsory Secondary Education, Vocational Training, Baccalaureate, other education
ORI	Counseling received and decision to go to university
LAB	Work and pre-professional experiences
ACA	Academic experience during university studies
CAB	Causes of dropout
PER	Personal and occupational trajectory of post-leavers
FOR	Post-dropout academic path
CON	Suggestions and advice

FIGURE 3
Biographical interview applied to dropout students.

	University	Almería	Cádiz	Córdoba	Granada	Jaén	Málaga	Total
Gender	Man	1	1	1	9	2	2	16
	Woman				2	4	1	7
Knowledge areas	Natural & Bio-Sciences & Social Sciences	1		1	1	3	1	7
					3		1	4
	Humanities		1		5	2		8
	Tech				2	1	1	4
Total		1	1	1	11	6	3	23
Age Average		24	19	29	26	26	26	25

FIGURE 4
Estructura de la muestra.

3. Results

3.1. Overall results

Firstly, the word count consultation carried out has allowed us to establish a "library" of abandonment from the perspective of the research participants. The library, which includes the concepts most used by the students who dropped out and participated in the research, is summarized in Figure 5, highlighting the concepts with the greatest relative weight in Figure 6. These concepts are, in order of frequency: University; Studies; Positive; Teachers; Positive; Teachers; Work; Memories; University Degree; Subjects; dropout and graduation (together with the associated word family).

The cloud of concepts generated from the frequency query also shows that the core of concepts that students handle around the process of dropping out, which is not considered negative ("good") and which is concentrated around the university and the studies taken ("university," "studies," and "career"), is complemented by reference to the completion of studies and dropping out ("degree" and "dropout") and to "memories" of "class," "teachers" and "subjects" ("good") and "memories" of "class," "teachers" and "subjects" ("good") (see Figure 7).

Finally, the self-coding on feelings gives us a general idea of how the students have experienced the dropout process and whether positive or negative aspects dominate in their memories. In our case, out of 486 codes extracted by the program, 22 are indicated as "very negative" and 66 as "very positive," with those labeled as "moderately negative" –168– and those labeled as "moderately positive" -230- being much more represented. Thus, NVivo® presents the participants' experiences and feelings about the abandonment process as "neutral" – neither positive nor negative – both at the global level and in each of the cases analyzed (see Figure 8).

3.2. A model of knowledge about dropout

From the narrative review of the CAB and CON dimensions of the interview, it has been possible to construct a conceptual map on the most relevant factors for dropout and the advice offered by participants to prospective students and universities (Figure 9).

Although there are factors (causes) associated with dropout that are circumstantial, such as a «pandemia mundial que al año siguiente tendría que pagar la misma matrícula y con la incertidumbre de hacer

Word	Length	Counting	Similar words
Estudios (Studies)	8	338	estudia, estudiaba, estudiabas, estudiado, estudian, estudiando, estudiar, estudiara, estudiarle, estudiarlo, estudiasen, estudié, estudien, estudio, estudios, estudiosa
Universidad (University)	11	260	universidad, universidades
Carrera (Career)	7	219	carrera, carreras
Profesores (Teachers)	10	216	profesor, profesora, profesorado, profesoras, profesores
Trabajos (Jobs)	8	192	trabaja, trabajaba, trabajada, trabajado, trabajador, trabajadores, trabajando, trabajar, trabajas, trabajé, trabajo, trabajos
Universitaria (Universitary)	13	163	universitaria, universitarias, universitario, universitarios
Asignatura (Subject)	10	137	asignatura, asignaturas
Abandoné (I abandoned)	8	136	abandonado, abandonando, abandonar, abandonarla, abandonarlo, abandonasen, abandonaste, abandone, abandoné, abandono
Títulos (Courses)	7	115	titula, titulación, titulaciones, titulada, titulado, titulados, título, títulos
Clase (Class)	5	102	clase, clases
Académico (Academic)	9	95	académica, académicamente, académicas, académico, académicos
Orientarnos (Guide Us)	11	94	orientaban, orientación, orientaciones, orientada, orientado, orientador, orientadora, orientadores, orientados, orientar, orientara, orientaran, orientarnos, orientaron, orientativa, orientativo, orientó
Cambié (I changed)	6	76	cambia, cambiado, cambiamos, cambiar, cambiara, cambiarme, cambiaron, cambiaste, cambie, cambié, cambio, cambios
Laboral (Labour)	7	71	laboral, laborales, laboralmente
Compañeros (Schoolfellow)	10	70	compañeras, compañero, compañeros
Práctico (Practic)	8	65	práctica, practicaba, practicabas, practicado, prácticamente, prácticas, práctico, prácticos
Alumnos (Students)	7	61	alumna, alumnado, alumnas, alumno, alumnos
profesionalmente	16	59	profesional, profesionales, profesionalmente
Motivó (Motive)	6	59	motiva, motivaba, motivación, motivado, motivar, motivarse, motive, motivo, motivó, motivos
Personas (People)	8	58	persona, personas
Padre (Father)	5	55	padre, padres
Conocimiento (Knowledge)	12	54	conocer, conocí, conocía, conocida, conocido, conociendo, conociera, conocimiento, conocimientos
Resultados (Outcomes)	10	49	resulta, resultaba, resultaban, resultado, resultados, resultaron, resultó
Enseñar (Teach)	7	46	enseña, enseñaba, enseñaban, enseñado, enseñan, enseñanza, enseñanzas, enseñar, enseñas, enseñen
Colegio (School)	7	45	colegio
Formación (Training)	9	45	formación

FIGURE 5
Dropout-related concept library (selection).

curso online o hacer curso presencial» (JA03) (global pandemic that the following year I would have to pay the same tuition and with the uncertainty of taking an online course or taking a classroom course), those that appear are organized around: (a) the teaching staff; (b) the subjects and the career; (c) factors related to motivation; (d) factors related to integration and commitment; (e) economic resources; (f) and work or family problems.
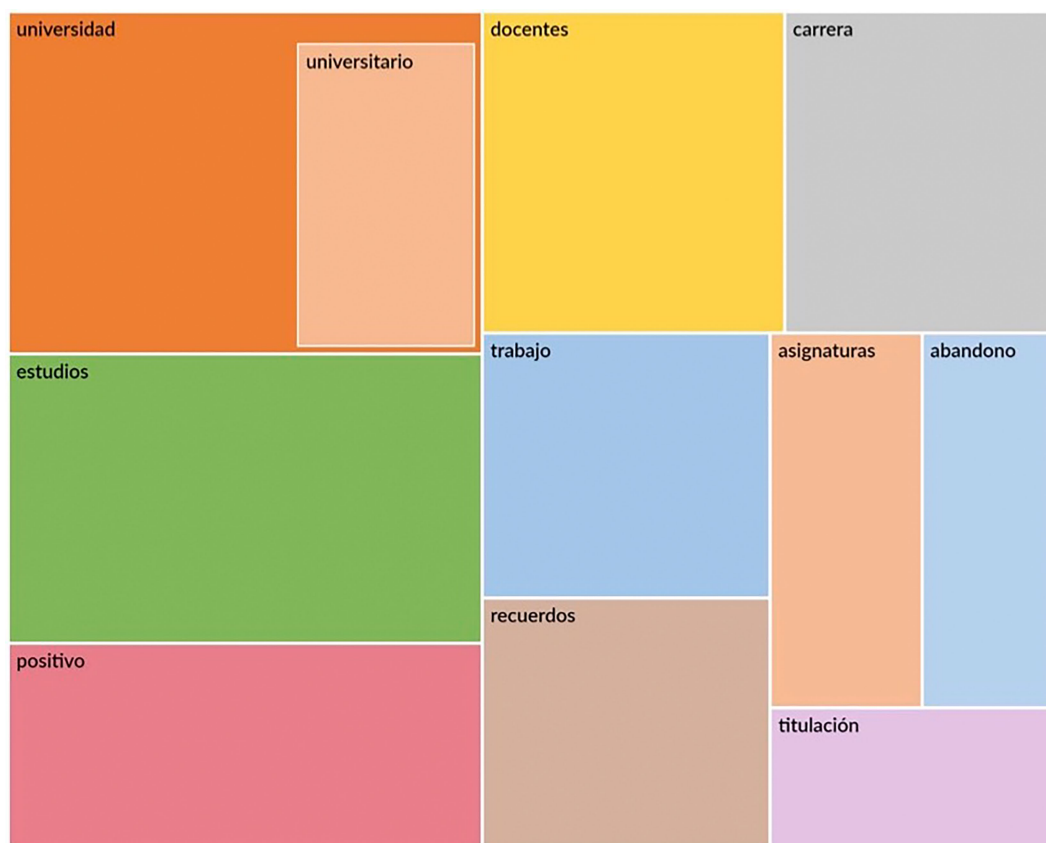
FIGURE 6
Representation of the concepts with the highest relative importance that make up the abandonment library. Caption (top to bottom-left to right):
(A) universidad (University), **(B)** universitario (Undergraduate), **(C)** estudios (Studies), **(D)** positivo (Positive), **(E)** docentes (Teachers), **(F)** carrera (Career),
(G) trabajo (Job), **(H)** asignaturas (subjects), **(I)** abandono (Dropout), **(J)** titulación (Grade).
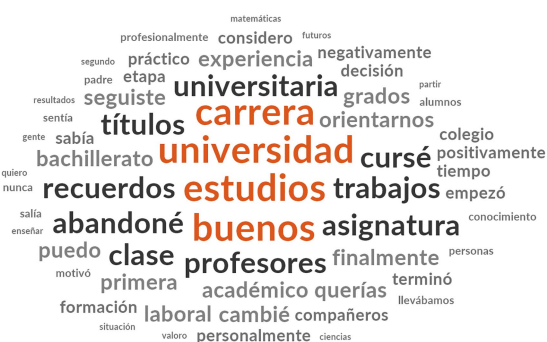

FIGURE 7
Word cloud generated from frequency query (Spanish). Caption -big words-: universidad (University), buenos (Good), estudios (Studies), profesores (Teachers), carrera (Career), trabajo (Job), asignatura (subject), abandono (Dropout), titulación (Grade); recuerdos (Memories).

As for the teaching staff, there is a certain lack of involvement and renewal of contents and methods: «el profesor de informática que nos explicaban cositas de matemáticas como si fuéramos retrasados» (GR05) (the computer teacher who explained little things about mathematics to us as if we were retarded).

The subjects, the syllabi, and the degrees themselves are the subject of reflections that place them among the causes of dropout. On the one hand, there is some talk about the difficulty of the courses. JA01 indicates that «abandoné porque después de intentarlo mucho me di cuenta de que no avanzaba en los estudios y cada vez eran más difíciles» (I dropped out because after trying a lot I realized that I was not progressing in my studies and they were getting harder and harder). Also the repetition of content (GR01 states that «estaba un poco desilusionada. Rollo, el temario era muy repetitivo para el primer año, vale. El segundo, vuelves y haces otra vez lo mismo y cuando empiezas el tercero y ves que hacen lo mismo, es como que echas aquí cuatro años para aprender absolutamente nada» (I was a little disappointed. The syllabus was very repetitive for the first year. The second, you come back and do the same thing again and when you start the third and see that they do the same thing, it's like you spend 4 years here to learn absolutely nothing") and its eminently theoretical character is highlighted by some students, such as JA02, who states that «lo que me motivó realmente fueron el poco interés que había en ese grado a la actividad práctica y el tanto que había el marco teórico había acercamiento a la historia desde un punto de vista práctico. Simplemente era absorción de conocimiento y luego plasmarlos en un examen» (what really motivated me was the little interest there was in that grade to practical activity and the fact that there was so much theoretical framework there was an approach to
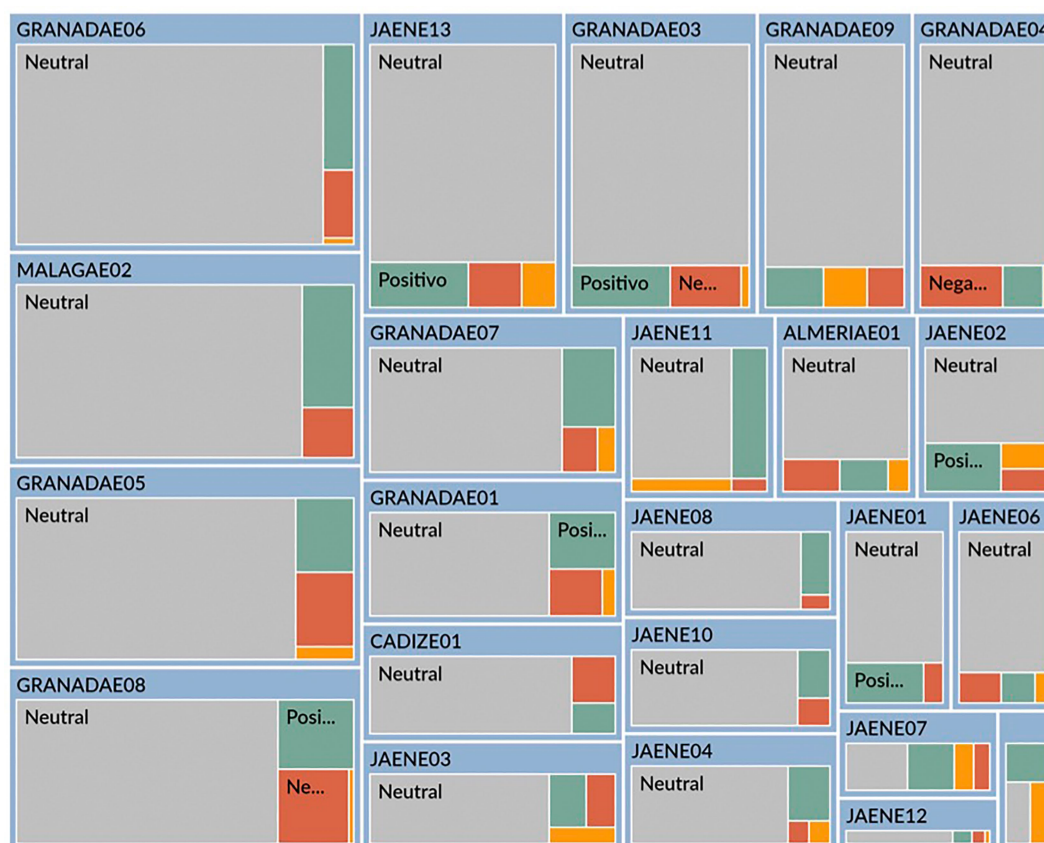
FIGURE 8
Representation of self-coding based on feelings. Caption (top to bottom-left to right): **(A)** GRANADAE06 (Neutral), **(B)** MALAGAE02 (Neutral), **(C)** GRANADAE05 (Neutral), **(D)** GRANADAE08 (Neutral), **(E)** JAENE13 (Neutral), **(F)** GRANADAE07 (Neutral), **(G)** GRANADAE01 (Neutral), **(H)** CADIZE01 (Neutral), **(I)** JAENE03 (Neutral), **(J)** GRANADAE03 (Neutral), **(K)** JAENE11 (Neutral), **(L)** JAENE08 (Neutral), **(M)** JAENE10 (Neutral), **(N)** JAENEE04 (Neutral), (Ñ) GRANADAE09 (Neutral), **(O)** ALMERÍAE01 (Neutral), **(P)** JAENE01 (Neutral), **(Q)** JAENE07 (Neutral), **(R)** JAENE12 (Neutral), **(S)** GRANADAE04 (Neutral), **(T)** JAENE02 (Neutral), **(U)** JAENE06 (Neutral).
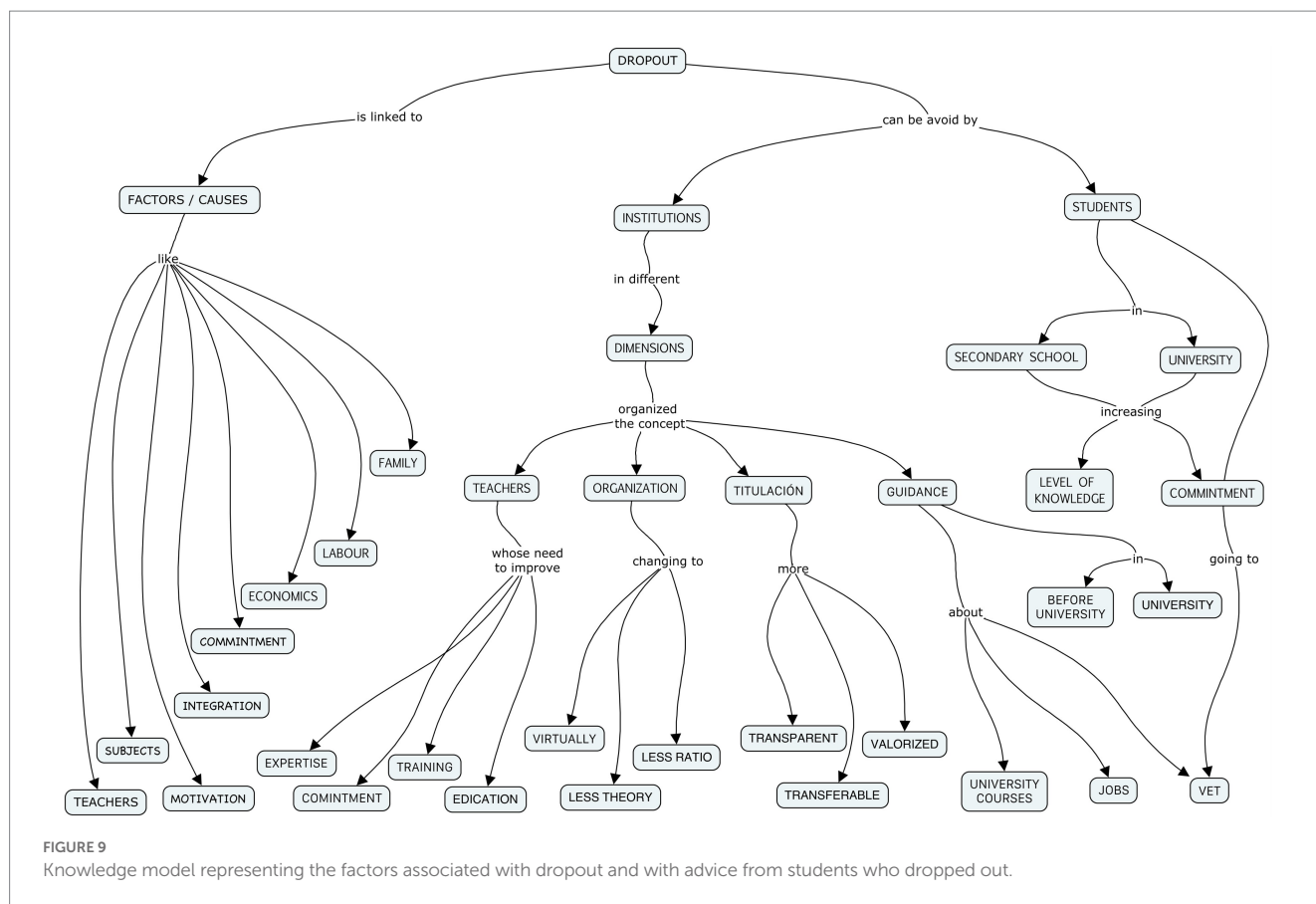
history from a practical point of view. It was simply a matter of absorbing knowledge and then translating it into an exam). The transparency and transferability of the degrees is questioned in some cases because «se suponía que ibas a convalidar medio curso, luego no convalidaron nada, me voy a Murcia y ya tuve una lesión que luego no pude terminar tampoco los exámenes» (CA01) (you were supposed to validate half a course, then nothing was validated, I went to Murcia and I had an injury and then I could not finish the exams either).

In some cases, it is the degree that is considered a mistake: «aparte de que ni una asignatura, ni una carrera que me llenaba» (JA03) (apart from the fact that neither a subject, nor the studies that made me happy," leaving «porque no me gustaba la carrera. Me equivoqué cuando me metí. No era lo que yo esperaba» (AL01) (because I did not like the courses. I was wrong when I got into it. It was not what I expected). And this fact is usually associated with «no encontrar significatividad a lo que estaba haciendo y de no encontrar una motivación y una fuente de orientación dentro del sistema universitario» (JA04) (not finding significance to what I was doing and not finding a motivation and a source of orientation within the university system).

Motivation appears recurrently in the perceptions of the interviewees: JA06 affirms that he dropped out «porque me faltaba motivación, al no obtener los resultados» (because I lacked motivation,

because I did not get the results); MA02 affirms that «el último año de la universidad pues ya prácticamente como no estaba motivado fue cuando un poco abandoné el tema de los estudios y me enfoqué a vivir la vida» (in the last year of university, since I was practically not motivated, that was when I abandoned the subject of studies and focused on living life). GR03 presents it clearly when he states that «realmente, estoy pensando, creo que no llegué a presentarme ningún examen de primero, pero que tampoco me puse a preparármelo como tal» (In fact, I'm thinking, I do not think I took any exams in my first year, but I did not prepare for them as such).

Integration and commitment also appear frequently in the participants' accounts. In some cases, the focus is on teachers and peers («escasa atención por parte del profesorado y poca sociabilización entre compañeros» JA10; «era una gente ultra egoísta, nada más que queriendo presumir sus logros en vez de intentar aprender o enseñar y tal iban a presumir» GR04) ("little attention from teachers and little socializing among peers" JA10; "they were ultra-selfish people, just wanting to show off their achievements instead of trying to learn or teach and so on" GR04). In others, they recognize their own lack of commitment and academic and social integration: JA12 indicates that «no iba a todas las asignaturas al día, no estudiaba como tal de manera intensa, dedicándole un gran número de horas al día hasta que no se iba

FIGURE 9
Knowledge model representing the factors associated with dropout and with advice from students who dropped out.

(…) de lo que creo que han sido bastante buenos para el esfuerzo que realicé» (I did not go to all the subjects a day, I did not study as such in an intense way, dedicating a large number of hours a day until I did not leave (…) so I think they were quite good for the effort I made); GR07 states that «no quiere decir esto que no me haya esforzado, pero sí que los resultados considero que sí, que marca un periodo importante de tu vida» (this does not mean that I did not make an effort, but I do think that the results are good, that it marks an important period in your life); and finally GR06 indicates that «no la aproveché lo suficiente, no porque no me dieran opciones, sino porque yo a lo mejor lo dejé un poquillo» (I did not make enough of it, not because they did not give me options, but because maybe I did not care too much).

Another remarkable aspect is the lack of resources as a determinant factor or cause of dropout, indicated by the participants, which is the lack of financial resources or the need to work to get them. JA08 states that «no podía persistir porque no aprobé todas y no tenía dinero para la matrícula. Me gustaba la carrera, pero no conseguí sacar las asignaturas» (I could not persist because I did not pass all of them and I did not have the money for tuition fees. I liked the course, but I did not manage to pass the subjects). JA10 also stresses the problem of resources, when he indicates that «mis motivos fueron escasa ayuda económica» (my reasons were lack of financial support). JA11 says that «verdaderamente, el principal motivo, como he dicho, fue el económico. El hecho de que ganase buen dinero y que hiciera falta fue lo principal para para no seguir» (the true main reason, as I said, was financial. The fact that I earned good money and that I needed it was the main reason for not continuing), the same as JA13, who tells us that he left «los estudios para trabajar por falta de

recursos económicos» (his studies to work due to lack of economic resources).

Finally, it is family problems or incompatibility with work that cause drop-out. Dropping out is caused by «el hecho de que entre el trabajo diario y luego otras circunstancias de tareas, digamos familiares que también tienes» (GR09) (the fact that between the daily work and then other circumstances of duties, let us say family duties that you also have), as time becomes the limiting factor: «por falta de tiempo y no por falta de ganas. Te digo, si tuviera tiempo seguiría estudiando» GR06 (due to lack of time and not due to lack of desire. I tell you, if I had time I would continue studying).

The narrative reorganization of the CON dimension allows us to build the hierarchical knowledge model (conceptual map agreed by experts –in this case the research team–), which shows the relationships or connections between the concepts shown. In our case, two categories or concepts generate a first level – the most inclusive –: students and institutions.

The concept "students" focuses on study, breaking down into "university" and "pre-university studies." The concept "institutions" unfolds into four less inclusive concepts: teachers; organization; qualification; and guidance which, in turn, is opened to university guidance, pre-university guidance and, with special emphasis, vocational training.

4. Discussion

The extensive literature on dropout reveals that several factors recur – with varying degrees of importance – in the different models

– of greater or lesser importance, and in some cases as the root cause of dropout. Our findings are generally consistent with the existence of these same factors as the ultimate cause or determinant of early dropout in the first 2 years of a university degree.

Returning to the factors presented at the beginning of this document as a result of recent literature reviews (Berlanga, 2014; Lizarte, 2020; Barroso et al., 2022; Lizarte Simón and Gijón Puerta, 2022), we will mark those that appear in our research after analyzing the content of the 23 semi-structured interviews that form it (see Figure 10, in grey the dropout factors that appear in our study).

First, we can say that there are no differences associated with the age or gender of the research participants, as well as with anxiety levels or mental health. Nor does the academic level of the parents seem to be related to the dropout factors in our case.

Secondly, economic factors are indeed reflected in several of the individuals interviewed, which seems to justify the concern to increase support for students through new scholarship policies in Spain (Fernández Mellizo, 2022).

Thirdly, factors linked to the student's academic and social integration and academic commitment remain essential factors in explaining the decision to drop out.

Looking at the results in the various dimensions, we can compare with some previous results in other research.

Dimension	Factor (Literature)	Our Research
	Family academic level (mainly mother or father)	
	Family financial situation	X
	Sex (male / female)	
	Mental health	
Biographical and socio-demographic attributes	Stress level	X
	Type of secondary education attended (Baccalaureate, VET, etc.)	X
	Level of autonomy (personal, economic)	X
	University studies choice (reasons, decisions, etc.)	X
	Qualifications in Secondary Education	X
Self-perceptions prior to entry into university studies	Perception of control and academic competence	X
	Anxiety levels	
	Intention to drop out (influenced by attitude and self-efficacy)	
Goals and commitment	Internal vs. external motivation	X
	Goals in studies	X
	Initial expectations regarding the chosen university course of study	X
	Order of career choice	X
	Experiences according to the gender of the participant	
	Number of credits enrolled and passed	
	Entry age	
	Scores obtained in university studies (mainly in technical and experimental science subjects)	X
Experiences in the institution	Failure in the first year of university studies	X
	Time spent studying	X
	Quality of interactions with teachers or fellow students	X
	Perceived support from teachers or fellow students	X
	Satisfaction with the institution	X
	Participation in academic and social groups (associations)	X
	Scholastic Conscientiousness versus disorder	X
	Satisfaction with academic and social integration	X
Academic and social integration	Learning strategies	X
	Time management	X
	Class attendance, satisfaction with courses and curriculum	X

FIGURE 10

Factors related to early dropout and its dimensions (comparison of our results and those of the literature). Source. From Berlanga (2014), Lizarte (2020), Barroso et al. (2022), and Lizarte Simón and Gijón Puerta (2022).

As for the dimension related to "Biographical and socio-demographic attributes," it is worth noting that we found no indications regarding the influence of gender on the decision to drop out, unlike other studies, which did find significant differences (Almås et al., 2016; Isphording and Qendrai, 2019).

Within the dimension "Self-perceptions prior to entry into university studies" appears in our research the item "Perception of control and academic competence," which is frequent in research that focuses on technological or natural science-related careers (Respondek et al., 2017, 2020).

In the "Goals and commitment" dimension, an interesting variable – especially in the Spanish context, which is frequently reported in the literature – is the "Order of career choice," since in our country, due to the scholarship policy, it is not very expensive to wait a year studying a degree that is not the first choice (Zumárraga-Espinosa et al., 2018; Contreras, 2021).

Within the dimension "Experiences in the institution," our study collects different factors. Scores obtained in university studies" have been recognized in previous studies and are now being used as a predictor of dropout, using learning machines (Solis et al., 2018). Time spent studying" also appears frequently in studies on dropout (Respondek et al., 2017) using also big data in the case of e-learning (Liang and Yang, 2016).

Finally, "Academic and social integration" is a dimension that is reflected in our study with different factors already referred to in the literature (Scholastic Conscientiousness, Satisfaction with academic and social integration, Learning strategies, Time management, Class attendance, satisfaction with courses and curriculum), and it also appears in many previous and current studies, so we deduce that it continues to be one of the important factors in the decision to leave, as indicated by different authors, both in Spain and internationally (Álvarez et al., 2016; Kehm et al., 2019; Aina et al., 2021; Piepenburg and Beckmann, 2022).

One issue that can perhaps be associated with the Spanish context is the frequency with which participants recommend attending VET-related courses before going on to university studies. In this sense, the existence of a higher number of university students in Spain than in other EU countries, to the detriment of higher vocational training studies, may justify part of the drop-out rate in terms of expectations not fulfilled by university education (practical training, immediate job placement, etc.).

This may be related to the need for more vocational guidance prior to university entrance.

In conclusion, the findings of our study do not differ from those of other geographical contexts and are generally in line with the factors or causes of early dropout that have been clearly established in the literature in recent decades. It is up to educational policies and higher education institutions to implement the processes of teacher training, curricular reorganization and academic and vocational guidance that, on a case-by-case basis, can help to reduce the risk of early leaving.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

Funding

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.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

Aina, C., Baici, E., Casalone, G., and Pastore, F. (2021). The determinants of university dropout: a review of the socio-economic literature. *Socio Econ. Plan. Sci.* 79:101102. doi: 10.1016/j.seps.2021.101102

Almås, I., Cappelen, A., Salvanes, K., Sørensen, E., and Tungodden, B. (2016). What explains the gender gap in college track dropout? Experimental and administrative evidence. *Am. Econ. Rev.* 106, 296–302. doi: 10.1257/aer.p20161075

Álvarez, P., Cabrera, L., González, M., and Bethencourt, J. (2016). Causas del abandono y prolongación de los estudios universitarios. *Paradigma* 27, 7–36.

Barroso, P. C. F. M., Oliveira, I., Noronha-Sousa, D., Noronha, A., Cruz Mateus, C., Vázquez-Justo, E., et al. (2022). Dropout factors in higher education: a literature review. *Psicologia Escolar e Educacional* 26, 1–10. doi: 10.1590/2175-35392022228736T

Bäulke, L., Daumiller, M., and Dresel, M. (2021). The role of state and trait motivational regulation for procrastinatory behavior in academic contexts: insights from two diary studies. *Contemp. Educ. Psychol.* 65:101951. doi: 10.1016/j.cedpsych.2021.101951

Bäulke, L., Grunschel, C., and Dresel, M. (2022). Student dropout at university: a phase-orientated view on quitting studies and changing majors. *Eur. J. Psychol. Educ.* 37, 853–876. doi: 10.1007/s10212-021-00557-x

Bean, J. P., and Metzner, B. S. (1985). A conceptual model of nontraditional undergraduate student attrition. *Rev. Educ. Res.* 55, 485–540. doi: 10.3102/00346543055004485

Berlanga, V. (2014). *La transición a la universidad de los estudiantes becados* Universidad de Barcelona. España. Available at: http://diposit.ub.edu/dspace/handle/2445/60244.

Berlanga, V., Figuera, M. P., and Pons, E. (2018). Modelo predictivo de persistencia universitaria: Alumnado con beca salario. *Educación XX1* 21, 209–230. doi: 10.5944/educxx1.20193

Casanova, J. R., Assis Gomes, C. M., Bernardo, A., Núñez, J. C., and Almeida, L. (2021). Dimensionality and reliability of a screening instrument for students at-risk of dropping out from higher education. *Stud. Educ. Eval.* 68:100957. doi: 10.1016/j.stueduc.2020.100957

Contreras, C. (2021). Determinación de variables predictivas de deserción inicial para generar un sistema de alerta temprana. Análisis sobre una muestra de estudiantes beneficiarios de la beca de nivelación académica en una universidad pública en Chile. *Calidad en la Educación* 54, 12–45. http://dx.doi.org/10.31619/caledu.n54.828.

Corominas Rovira, E. (2001). La transición a los estudios universitarios: Abandono o cambio en el primer año de universidad. *RIE: revista de investigación educativa* 19, 127–151. Available at: https://revistas.um.es/rie/article/view/96361

do Nicoletti, M. C. (2019). Revisiting the Tinto's theoretical dropout model. *High. Educ. Stud.* 9, 52–64. doi: 10.5539/hes.v9n3p52

Fernández Mellizo, M. (2022). *Análisis del abandono de los estudiantes universitarios de grado en las universidades presenciales en España.* Madrid: Ministerio de Universidades.

Figuera Gazo, P., and Torrado Fonseca, M. (2012). "La adaptación y la persistencia académica en la transición en el primer año de universidad: el caso de la Universidad de Barcelona," in *Congreso Internacional e Interuniversitario de Orientación Educativa y Profesional.* Available at: http://hdl.handle.net/2445/32417

Foster, C., and Francis, P. (2020). A systematic review on the deployment and effectiveness of data analytics in higher education to improve student outcomes. *Assess. Eval. High. Educ.* 45, 822–841. doi: 10.1080/02602938.2019.1696945

Gijón Puerta, J., and Crisol Moya, E. (2012). La Internacionalización de la Educación Superior. El caso del Espacio Europeo de Educación Superior. *REDU. Revista de Docencia Universitaria* 10, 389–414. doi: 10.4995/redu.2012.6137

González García, F. M., Veloz Ortiz, J. F., Rodríguez Moreno, I. A., Velos Ortiz, L. E., Guardián Soto, B., and Ballester Valori, A. (2013). Los modelos de conocimiento como agentes de aprendizaje significativo y de creación de conocimiento. *Education in the Knowledge Society (EKS)* 14, 107–132. doi: 10.14201/eks.10216

González, L., and Uribe, D. (2002). Estimaciones sobre la" repitencia" y deserción en la educación superior chilena. Consideraciones sobre sus implicaciones. *Calidad en la Educación* 17, 75–90. doi: 10.31619/caledu.n17.408

Ibáñez, P., Gijón, J., and González, F. (2014). "Revisión del conocimiento acumulado sobre mapas conceptuales a través del análisis de comunicaciones presentadas en los 5 congresos mundiales" in *Concept Mapping to Learn and Innovate: Proceedings of the Sixth International Conference on Concept Mapping.* 419–426.

Isphording, I., and Qendrai, P. (2019). Gender differences in student dropout in STEM. *IZA Res. Rep.* 87, 1–15. Available at: http://ftp.iza.org/report_pdfs/iza_report_87.pdf

Kehm, B. M., Larsen, M. R., and Sommersel, H. B. (2019). Student dropout from universities in Europe: a review of empirical literature. *Hungarian Educ. Res. J.* 9, 147–164. doi: 10.1556/063.9.2019.1.18

Liang, J., and Yang, J. (2016). "Big data application in education: dropout prediction in edx MOOCs" in *2016 IEEE second international conference on multimedia big data (BigMM).* (IEEE). 440–443.

Lizarte, E. J. (2017a). Biographical trajectory of a student who dropout pedagogy at the University of Granada. *Jett* 8, 267–282. Available at: http://hdl.handle.net/10481/56122

Lizarte, E. J. (2017b). *Análisis de los estudios en la Universidad de Granada: El caso de la Facultad de Ciencias de la Educación.* Granada: Universidad de Granada. Available at: http://hdl.handle.net/10481/62301

Lizarte, E. J. (2020). "Early dropout in college students: the influence of social integration, academic effectiveness and financial Stresse" in *Experiencias e Investigaciones en Contextos Educativos.* eds. F. J. Hinojo, F. Sadio, J. A. Lopez and J. M. Romero (Madrid: Dykinson), 519–531.

Lizarte, E. J., and Fernández, M. (2020). "Determinantes sociales e institucionales y percepción de los estudiantes de la Universidad de Granada sobre su eficacia en el estudio" in *Investigación Educativa e Inclusión. Retos Actuales en la Sociedad del Siglo XXI.* eds. T. Sola, J. A. López, A. J. Moreno, J. M. Sola and S. Pozo (Madrid: Dykinson), 415–430.

Lizarte, E. J., and Gijón, J. (2019). "Ambientes de aprendizaje para las nuevas y viejas metodologías en la Educación Superior" in *Investigación, Innovación Docente y TIC. Nuevos Horizontes Educativos.* eds. S. Alonso, J. M. Romero, C. Rodriguez and J. M. Romero (Madrid: Dykinson), 689–701.

Lizarte Simón, E. J., and Gijón Puerta, J. (2022). Prediction of early dropout in higher education using the SCPQ. *Cogent Psychol.* 9:2123588. doi: 10.1080/23311908.2022.2123588

Lowe, W. (2006). "Yoshikoder: an open source multilingual content analysis tool for social scientists," in *Annual meeting of the American Political Science Association, Philadelphia, PA.*

Pérez, F., and Aldás, J. (2019). U-Ranking. Indicadores Sintéticos de las Universidades Españolas. Fundación BBVA Ivie. Available at: http://dx.medra.org/10.12842/RANKINGS_SP_ISSUE_2019

Piepenburg, J. G., and Beckmann, J. (2022). The relevance of social and academic integration for students' dropout decisions. Evidence from a factorial survey in Germany. *Eur. J. Higher Educ.* 12, 255–276. doi: 10.1080/21568235.2021.1930089

Pierella, M.-P., Peralta, N.-S., and Pozzo, M.-I. (2020). El primer año de la universidad. Condiciones de trabajo docente, modalidades de admisión y abandono estudiantil desde la perspectiva de los profesores. *Revista iberoamericana de educación superior* 11, 68–84. doi: 10.22201/iisue.20072872e.2020.31.706

Respondek, L., Seufert, T., Hamm, J. M., and Nett, U. E. (2020). Linking changes in perceived academic control to university dropout and university grades: a longitudinal approach. *J. Educ. Psychol.* 112, 987–1002. doi: 10.1037/edu0000388

Respondek, L., Seufert, T., Stupnisky, R., and Nett, U. E. (2017). Perceived academic control and academic emotions predict undergraduate university student success: examining effects on dropout intention and achievement. *Front. Psychol.* 8:243. doi: 10.3389/fpsyg.2017.00243

Solis, M., Moreira, M., Gonzalez, R., Fernandez, T., and Hernandez, M. (2018). "Perspectives to predict dropout in university students with machine learning," in *2018 IEEE International Work Conference on Bioinspired Intelligence (IWOBI)*. (IEEE), 1–6.

Spady, W. G. (1970). Dropouts from higher education: an interdisciplinary review and synthesis. *Interchange* 1, 64–85. doi: 10.1007/BF02214313

Tinto, V. (1982). Limits of theory and practice in student attrition. *The Journal of Higher Education* 53, 687–700.

Tinto, V. (2010). "From theory to action: exploring the institutional conditions for student retention" in *Higher education: Handbook of theory and research*. ed. J. Smart (Springer)

Torrado Fonseca, M. (2012). *El fenómeno del abandono en la Universidad de Barcelona: el caso de ciencias experimentales*. Barcelona: Universidad de Barcelona. Available at: http://hdl.handle.net/10803/134955.

Torrado Fonseca, M., and Figuera Gazo, P. (2019). Estudio longitudinal del proceso de abandono y reingreso de estudiantes de Ciencias Sociales. El caso de Administración y Dirección de Empresas. *Educar* 55, 401–417. doi: 10.5565/rev/educar.1022

Vidal, J., Díez, G. M., and Vieira, M. J. (2002). Oferta de los servicios de orientación en las universidades españolas. *Revista de Investigación Educativa* 20, 431–448. Available at: https://revistas.um.es/rie/article/view/99001

Villena, M. D., Muñoz, A., and Polo, M. T. (2013). La Unidad de Orientación de Centro como instrumento para la Orientación Universitaria. *REDU: revista de docencia universitaria* 11, 43–62. doi: 10.4995/redu.2013.5566

Wild, S., and Heuling, L. S. (2020). Student dropout and retention: an event history analysis among students in cooperative higher education. *Int. J. Educ. Res.* 104:101687. doi: 10.1016/j.ijer.2020.101687

Zumárraga-Espinosa, M., Castro, M. I., Escobar, P., Boada, M. J., Peña Herrera, L., González, Y., et al (2018). Afinidad entre intereses profesionales y carrera elegida: un análisis de su relación con la deserción universitaria temprana, in Congreso CLABES.

Neurodidactic teacher training program for educational dropouts in vulnerable groups

Claudia De Barros Camargo[1]*, Carmen Flores Melero[1],
Cristina Pinto Díaz[1] and Cristina Marín Perabá[2]

[1]University Autonomous of Madrid, Madrid, Spain, [2]University of Jaén, Jaén, Spain

Neurodidactic is presented as an effective teaching tool for creating an equitable society, regardless of the population. This educational methodology, which has recently been introduced in teacher training, supports students with functional diversity, special educational needs, sensory diversity (visual or auditory), and those belonging to the Gypsy ethnic group. Neurodidactics emphasizes that the teacher's role is to create synapses in the neuronal structures through activities that a student finds innovative, attractive, and motivating. To achieve this, it is necessary to identify the aspects that should be included in the training of teachers to work with students who belong to vulnerable groups and to develop effective intervention programs based on neurodidactics. The study population comprises professors of higher education at the University of Jaen (UJA) who responded to a Likert scale survey using an operationalization table. The survey was conducted to determine the professors' knowledge of neuroscience, particularly neurodidactics.

KEYWORDS
neurodidactics, vulnerable groups, ethnic, Roma, functional diversity

1. Introduction

1.1. Neuroscience

Neuroscience is a field of study that focuses on the biological functioning of living organisms, with a particular emphasis on the brain and its responses to various experiences (Campuzano et al., 2019). Neuroscience has allowed the linking of different areas, so it is considered interdisciplinary. If the term neuroscience is referred in terms of the cognitive level, we mean the scientific field of cognitive neuroscience, which is relatively new and has emerged from the union between neuroscience and cognitive psychology, covering brain function from a multidisciplinary and human performance perspective (Redolar, 2014). In addition, neuroscience refers to the study of the nervous system and its functioning, thus the relationship between the brain and behavior has been established (Campuzano et al., 2019).

The neuroscientific basis can be defined across the four following dimensions: synaptogenesis, myelinogenesis, neurogenesis, and epigenesis (Siegel, 2012). Synaptogenesis refers to the creation of new neural connections and the hardening and strengthening of the existing connections. Myelinogenesis involves the process of enveloping interconnected axons with an insulating sheath to increase neural processing speed. Neurogenesis is the term used to describe the distinction between stem cells and fully mature cells; finally, epigenesis refers to the process of changing genes according to the environment (Miller, 2016).

The study of neurons and their role in daily activities has been made possible by technological advancements and the interdisciplinary nature of cognitive psychology, biology, and evolutionary psychology (Payarés, 2016).

Neuroscience has driven advances in knowledge concerning the treatment of psychiatric diseases and disorders, leading to the deceleration of cognitive decline and cellular aging (McMahon, 2016; Stroustrup et al., 2016) and, in turn, improving the cognitive functions of healthy individuals in non-clinical settings (Sahakian and LaBuzetta, 2015). Techniques such as neuroimaging have been instrumental in the primary measurement of the neural activity associated with a mood state, as was the case for behaviors in the human species. In addition, novel neuromodulation interventions such as neurofeedback, non-invasive brain stimulation, and cognitive training can induce changes in the brain's plasticity, leading to improved learning (Trenado et al., 2021). Thus, neuroscience must be included in teacher training to provide quality education and dispel neuromyths related to education (Hernández, 2022).

Although criticized by many (Salles, 2013), neuroscience has introduced significant scientific importance and normativity into the study of the social sciences.

1.2. Neurodiversity, neuroeducation, and neurodidactics

The concept of neurodiversity was coined by people with autism, and it was later embraced by other groups with functional diversity upon reconceptualization. This idea proposes a wide spectrum of neurological differences, and autism is one of many (Tonatiuh and Anguiano, 2019). The term "neurodiversity" was first used by the autism community in 1998, with Asperger's syndrome being another term created by the Australian activist Judy Singer (Armstrong, 2005). Consequently, most researchers interested in neurodiversity study autism. However, at present, neurodiversity has evolved beyond its original conception and has become a movement that offers a new approach to understanding atypical neurological developments in behavior (Moreno, 2021). Thus, neurodiversity refers to the diversity of the brains and minds among people, encompassing the infinite changes in neurocognitive functioning that are associated with psychological development (Silberman, 2015; Vidal and Diaz, 2016).

By applying the strategies of neuroscience, neuroeducation, neurolearning, neurodidactics, and neuroassessment, students' academic results can improve. The reason for this improvement is that the teacher better understands how the brain and its mechanisms work (Pherez et al., 2018).

Originally, the relationship between neuroscience and education was viewed as conflicting. However, the subject has since been consolidated and integrated across the fields of neurology, psychology, and educational research, giving rise to the emergence of educational neuroscience or neuroeducation (Parra-Díaz et al., 2019). The neuroscientific contributions to education have made it essential to reorganize pedagogical practices to better align with how the brain works, leading to the emergence

of education with scientific connotations in the 20th century (Hernández, 2022).

Neuroeducation is a recent field of study that connects neuroscience with education (Hernández and De Barros, 2021). Neuroeducation is a branch of education linked by knowledge based on neuroimaging to the way in which the brain interacts with its environment (Hernández, 2022). Regarding neuroeducation, it is fundamental to highlight the importance of emotional management and control. Emotion plays an essential role in the decisions made on a daily basis, which means that the quality of our decisions can be affected by our mood. This highlights the importance of neuroeducation for teachers (Logan et al., 2014). Neuroeducation attempts to provide education professionals with educational strategies and technologies based on the brain's functions to make teaching more effective (Battro, 2016).

Similarly, neurodidactics is known for providing various efficient strategies that promote neuronal development, which, in turn, enhances learning. When working with vulnerable groups or students with specific learning difficulties, teachers must possess knowledge of brain structures to adapt their strategies and promote meaningful activities (Paniagua, 2013). This is directly linked to the study objective of this research, which is to analyze teachers' need to study neuroeducation to promote the learning of vulnerable groups. Currently, neurodidactics is considered a part of pedagogy with a scientific basis that guides innovative education. It involves a method of teaching and learning based on neuroscience. In other words, it is an extension of neuroeducation since it studies the application of neuroeducation in the classroom (De Barros and Hernández, 2022).

1.3. Culture, ethnicity, and diversity

Culture is constantly evolving, which is why it is essential for teachers to remain active in their learning. In the classroom, activities and methodological strategies should be designed to approach Gypsy culture not as something exotic or picturesque but as scientific knowledge that is part of our history and as values for democratic coexistence (García, 2017).

Two of the main problems observed in relation to ethnic differences are that attention to diversity in schools is associated with the conception that each teacher has regarding the different cultures that exist and that can be found; thus, it will depend on the conception and morality of the teacher, as well as their recognition of the ethnicities, territories, and ideologies that can be presented in their classrooms. Another problem is the tension involved in resolving these differences (Campoflor et al., 2016).

In the school context for Gypsy students, it is necessary to emphasize the importance of an inclusive school climate and teachers who stimulate and promote high expectations for these students to enhance their performance and socialization (Abajo and Carrasco, 2004). To increase the expectations and motivation of students, it is necessary to work on emotional intelligence, including improving empathy and collaboration between students (Mayer and Salovey, 1997; Goleman, 2011).

"We are emotional brains. Therefore, the role of the teacher is to foster spaces of pleasure and security... that allow participants to give their best" (Vega, 2022, p. 17).

On the basis of the above, the present investigation aimed to assess the neurodidactic knowledge of future teachers to address cultural differences stemming from ethnicity and functional diversity that may arise in their classrooms.

The problem addressed in this research is the inadequacy of teacher training in neurodidactic aspects as a tool to support educational dropouts in vulnerable student groups.

The main objective of this research was to evaluate the level of knowledge of teachers in neurodidactics and its application to vulnerable groups.

2. Method

2.1. Context of the research

This research was carried out in Jaén, which is a small city in northern Andalusia, Spain. Approximately 42% of the Gypsy population is registered in Andalusia. Specifically, in Jaén, according to the sociodemographic data of the Gypsy Secretariat, there are more than 10,000 people of Gypsy ethnicity. With regard to education, according to the Gypsy Secretariat, an educational gap is beginning to appear, especially in primary education.

In addition, according to the Observatorio de la Infancia en Andalucía (2020), 7,762 students with functional diversity have been enrolled in Andalusian primary education. In Andalusia, 0.3% of the foreign students enrolled in school have disabilities.

2.2. Hypothesis

The following null hypothesis is defined as follows: H_0-Teachers are trained to apply neurodidactics to students from vulnerable groups.

2.3. Population and sample

To investigate the training of teachers in neurodidactic knowledge to prevent school dropout in the vulnerable student groups, the population of interest was undergraduate students at the University of Jaén during the academic years 2022–2023. A convenience sample of 67 participants from the Primary Education department was selected for this study.

2.4. Research design

This research was characterized by an experimental design that is exploratory, descriptive, and correlative, and it was carried out through a quantitative methodology. The software used was the SPSS v.25 statistical package.

2.5. Research instrument

According to Mejía (2005), an operationalization matrix must be developed to create the research instrument. This matrix establishes the variables, items, and units of measurement.

This scale was composed of 24 items, grouped into four dimensions: A (teaching performance), B (vulnerable groups), C (beliefs), and D (inclusion). These theoretical items were based on a review of the scientific literature (Hernández and De Barros, 2016; De Barros and Hernández, 2018; Sims et al., 2021; Pinto and Flores, 2022).

The transition from the Likert scale to the aforementioned sample was made using both in-person and online questionnaires. The questionnaire was anonymous and voluntary for all participants, indicating that they could withdraw from the investigation at any time. Prior to completing the questionnaire, participants were informed of the research objectives and the commitment to publishing the results in the article once the study was completed.

2.6. Validity of content

To ensure content validity, a content validity evaluation was carried out by university professionals who agreed to participate in the study (Malla and Zabala, 1978). The knowledge or information coefficient (Kc) and the argument coefficient (Ka) were determined for these professionals, and based on these values, the value of the Competence Coefficient (K) was determined to determine which experts should be included for this research. Based on the results, 15 specialists were selected with an average K of 0.9, which shows a high level of competence (Mengual, 2011). After analyzing the validation questionnaires, some questions were modified without affecting the substance of the issue. In addition, a pilot test was carried out on a subgroup of the sample to review comprehension difficulties and identify problematic questions, and the corresponding checklist was used (Iraosi, 2006). The pilot test results were satisfactory, and the instrument was validated.

2.7. Construct validity (exploratory factor analysis)

The factor analysis technique used in this research follows the stages marked (García Ferrando, 2015).

2.8. Study of the correlation matrix

It was important to analyze the correlation matrix to determine if our data were suitable for factor analysis. To do this, this matrix must have a certain structure. The Kaiser-Meyer-Olkin sampling adequacy measure (KMO coefficient) was used to verify this. In this case, the value was 0.671. According to Kaiser (1974), this value is acceptable; Bartlett's sphericity test is significant (0.000), and the determinant had a value of $7.540E^{-6}$. Based on these results, we proceeded with the factor analysis.

TABLE 1 Total variance explained.

Component	Initial eigenvalues			Sums of squared loading from extraction			Sums of squared loadings from rotation		
	Total	% variance	% cumulati-ve	Total	% de varian-ce	% acumula-tive	Total	% de varian-ce	% acumula-tive
1	4,787	19,948	19,948	4,787	19,948	19,948	3,331	13,879	13,879
2	3,357	13,987	33,935	3,357	13,987	33,935	2,885	12,021	25,900
3	2,394	9,976	43,911	2,394	9,976	43,911	2,677	11,154	37,054
4	1,907	7,946	51,857	1,907	7,946	51,857	2,272	9,466	46,520
5	1,260	5,249	57,106	1,260	5,249	57,106	1,691	7,048	53,567
6	1,129	4,704	61,810	1,129	4,704	61,810	1,634	6,809	60,376
7	1,058	4,409	66,219	1,058	4,409	66,219	1,402	5,843	66,219
8	,987	4,114	70,333						

Extraction method: principal component analysis. Source: own elaboration.

2.9. Extraction of commonalities

The extraction of the commonalities obtained shows that these factors have a value >0.349, so we decided that there was no need to delete any item.

The best-represented items are as follows:

B9.-All students with auditory and/or visual functional diversity are considered vulnerable groups. (0.923)
B10.-All students with intellectual and functional diversity are considered to be from vulnerable groups.

The worst-represented items are as follows:

B11.-All students from vulnerable groups have problems with adaptation in different areas. (0.471)

This item leads to the reflection that the teacher considers that curricular adaptation is needed at some of its levels for any student belonging to one of the vulnerable groups.

B12.-Students from vulnerable groups may have access to the curriculum on a daily basis. (0.376)
D19.-You consider yourself an inclusive person. (0.349)

2.10. Total variance explained

There are specific rules to determine the most appropriate number of factors to retain. In this case, the commonly used Kaiser (1974) criterion suggests retaining the first seven factors, which explain 66.219% of the accumulated variance, as presented in Table 1.

Table 1 shows the seven components statistically extracted from the data provided by the participants, showing that these factors can explain more than half the variance in the responses.

2.11. Component matrix

Then, the component matrix was calculated, which is shown in Table 2. The matrix corresponding to Table 2 shows

TABLE 2 Study of factor scores.

Factors	
1	A2
	B7, B8, B9, B10, B11
	C13, C17, C18
	D19, D20, D21
2	A1, A3, A4, A5, A6
	D22, D23, D24
3	C14, C16
4	B12
5	
6	C15
7	

Source: own elaboration.

the scores that we had to study to obtain the reduced final scale.

2.12. Study of factor scores

Having already calculated the factorial scores, the analysis of the explained and accumulated variance, and the determination of factors and distribution of items according to the highest level of factor saturation, we constructed the table of items integrated into each factor.

Within the exploratory analysis, it is relevant to examine the grouping of the items of the original questionnaire prior to the reduction and creation of the final proposal.

After calculating the factorial scores, analyzing the explained and accumulated variance, and determining the factors and distributed elements according to the highest level of factor saturation, we constructed the table of elements integrated into each factor. Within the exploratory analysis, it is pertinent to examine the grouping of the points of the original questionnaire before the reduction and creation of the final proposal.
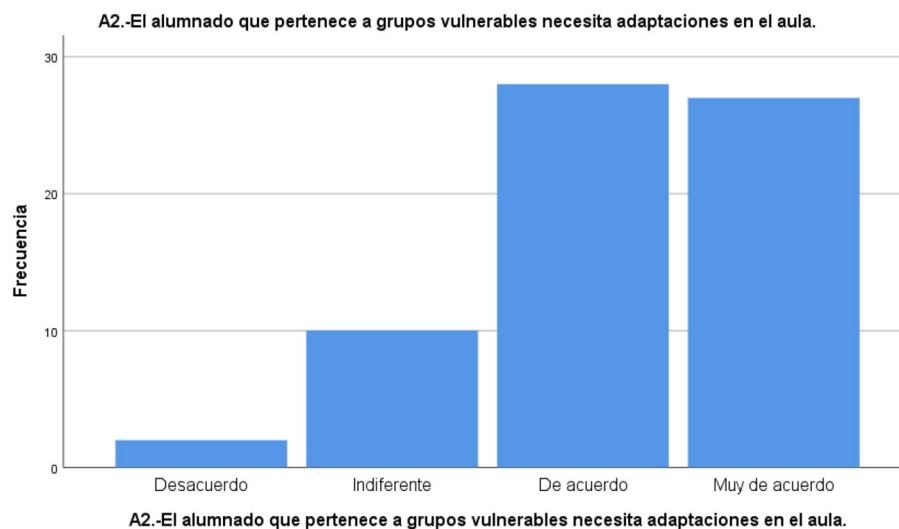
Dimension A (teaching performance): the participants agree (x = 4.19) that students belonging to vulnerable groups need curricular adaptations in the classrooms.
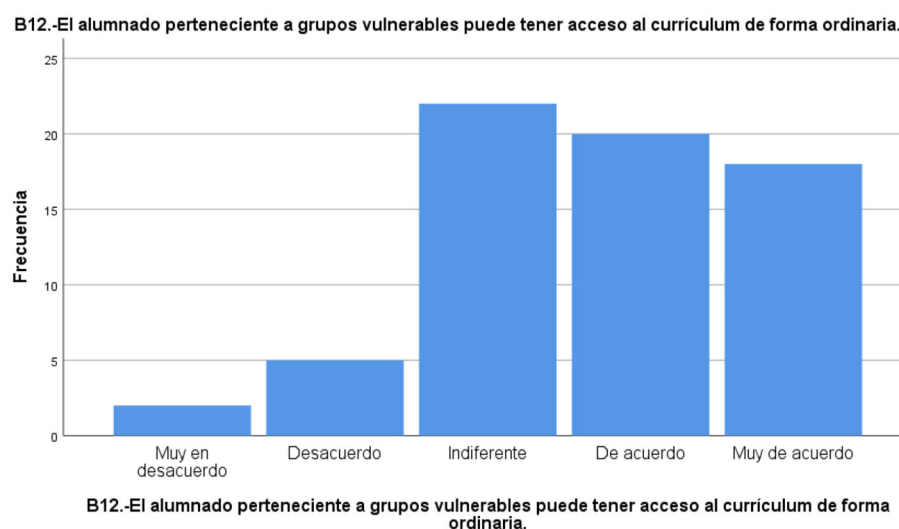
Dimension B (vulnerable groups): respondents respond in agreement (x = 3.75) that students belonging to vulnerable groups can access the curriculum on an ordinary basis.

3. Results

3.1. Correlation analysis

To perform the correlation, we submitted the questionnaire to the K-S test, which resulted in the rejection of the null hypothesis. This indicates that the data followed an abnormal distribution; thus, we used the Spearman-Rho correlation.

Significant correlations are given.

A (teaching performance) <> D (inclusion): According to the data obtained, the variable A of teaching performance correlates significantly with variable D on inclusion in 0.427, more specifically in the following items A2. Students belonging to vulnerable groups need to adapt to the classroom and D20. Students from vulnerable groups have difficulties with educational inclusion. It was considered that the most vulnerable students with the problems of inclusion would need curricular adaptations in the classroom. Llorent and López-González (2010) highlighted in their study that society has not yet facilitated the inclusion of people with diversity since, in many studies, these people prefer to be in the same environment as other people with the same abilities.
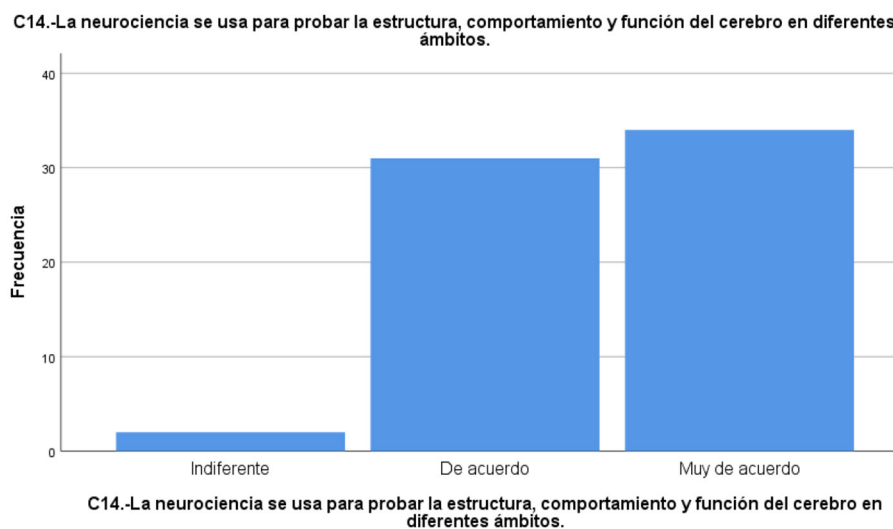
Dimension C (beliefs): subjects strongly agree that neuroscience is used to test brain structure, behavior, and function in different domains (x = 4.48). In the event of learning difficulties, teachers need to have knowledge of brain structures to change strategies and promote meaningful activities for their students (Paniagua, 2013).

B (vulnerable groups) <> B (vulnerable groups) the following items B8. All students with functional motor diversity are considered a vulnerable group and B9. All students with auditory and/or visual functional diversity are considered part of the vulnerable groups, and the correlation between them is 0.898.

C (beliefs) <> B (vulnerable groups): According to the data obtained, variable C of beliefs correlates with variable B on vulnerable groups in 0.366, more specifically in items B7. All Gypsy students are considered a part of vulnerable groups and C15. Learning styles are considered a neuromyth. With this correlation, it can be concluded that those who consider Gypsies vulnerable groups also consider that learning in one way or another is a neuromyth, which makes us believe that they may consider that being students belonging to the Gypsy race does not mean having different learning styles than ordinary ones.

D (inclusion) <> A (teaching performance): According to the data obtained, variable D on inclusion correlates significantly with variable A of teaching performance in 0.289, more specifically in items D24. Students with functional diversity feel included in the educational sphere and A1. Students belonging to vulnerable groups achieve the objectives of the primary education curriculum. Teachers who hold the belief that students from vulnerable groups feel included also believe that they are able to achieve their curricular goals. This highlights the significant impact a teacher's beliefs and perspectives can have on the attainment of educational objectives.

3.2. Descriptive analysis

As initially proposed in Hypothesis 0, teachers recognize the importance of applying neurodidactics to students belonging to vulnerable groups, as can be viewed in the descriptive analysis shown in Figures 1–4.

The importance of teacher training is deduced from the inclusion of students belonging to vulnerable groups. The inclusion of Gypsy students must begin with the teacher. It should be shown as an example to the rest of the pupils, and its training should be adequate and capable of making the most relevant adaptations for each pupil so as not to exclude the vulnerable pupil (Navas Luque and Cuadrado Guirado, 2003).

Teachers consider that the disability in question does not matter. They are part of a vulnerable group. To some extent, this can be considered advantageous for its better curricular adaptation within the classroom. Teachers often attempt to label students, but some are against this practice. However, of the purpose of classifying students according to their characteristics aims to adapt and propose appropriate learning methodologies for personal development. Let us look at the main characteristics of a person with disabilities (Soro Camat et al., 2012).

Finally, a more in-depth statistical analysis has been carried out to obtain more concrete answers to the research problem.

Using a linear regression model, we verified the importance of the different items, with a focus on the vulnerable groups (which can be seen in item B12), and the objective of neuropedagogy, which is observed in item C17, states that neurodidactic helps learners establish appropriate methodologies for vulnerable groups, which is the central object of this research.

The result can be seen in Figure 5, where we can see that the regression is effective; however, to determine the items that are classed to achieve the objective of the study, we resorted to automatic regression modeling, obtaining the following Figure 6.
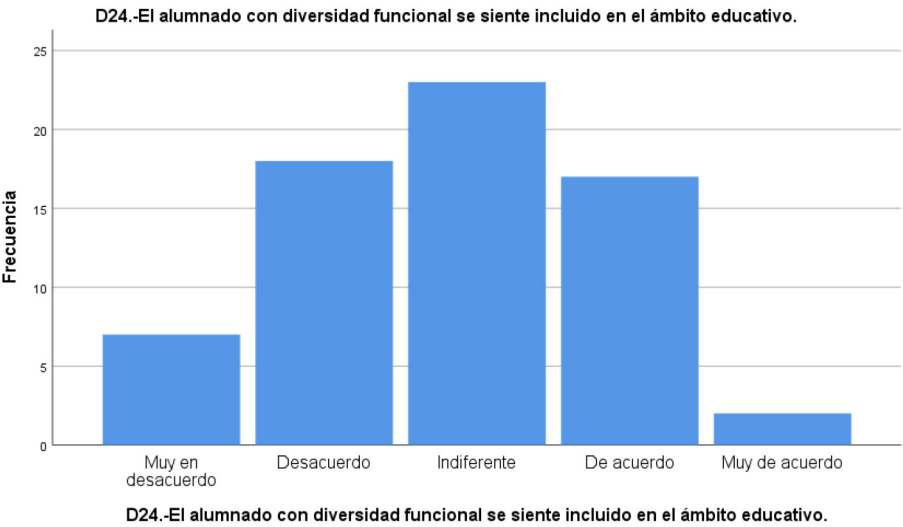
FIGURE 4
Dimension D (inclusion): the respondents show very little agreement (x = 2.85) that students of Roma ethnicity and students with functional diversity feel included in the educational sphere. We deduced from these data that it is believed that the students of the vulnerable group (in general) do not feel part of the group; that is, they feel excluded (Manota and Melendro, 2016).
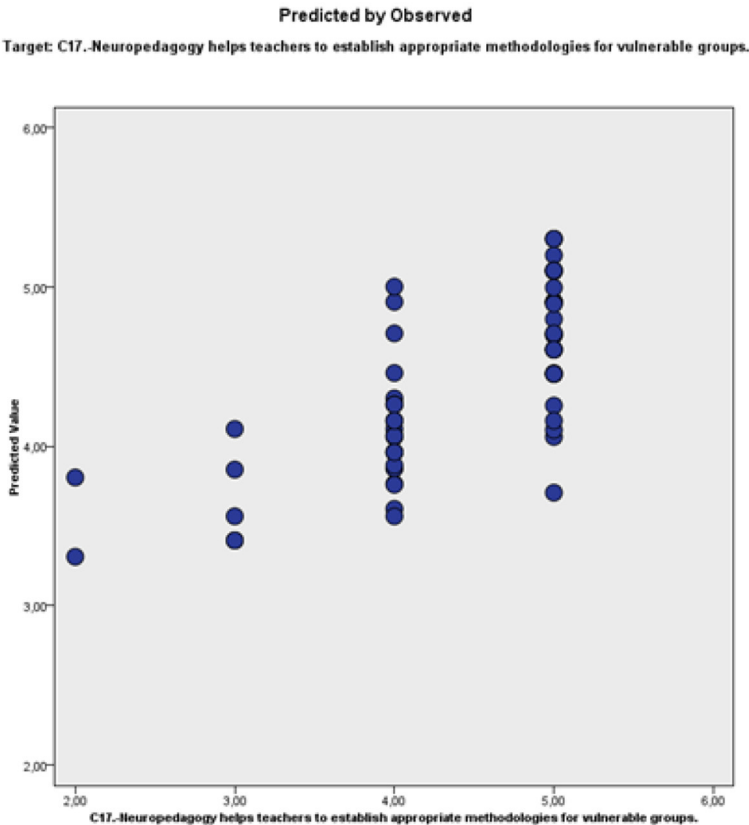

FIGURE 5
Linear regression analysis.
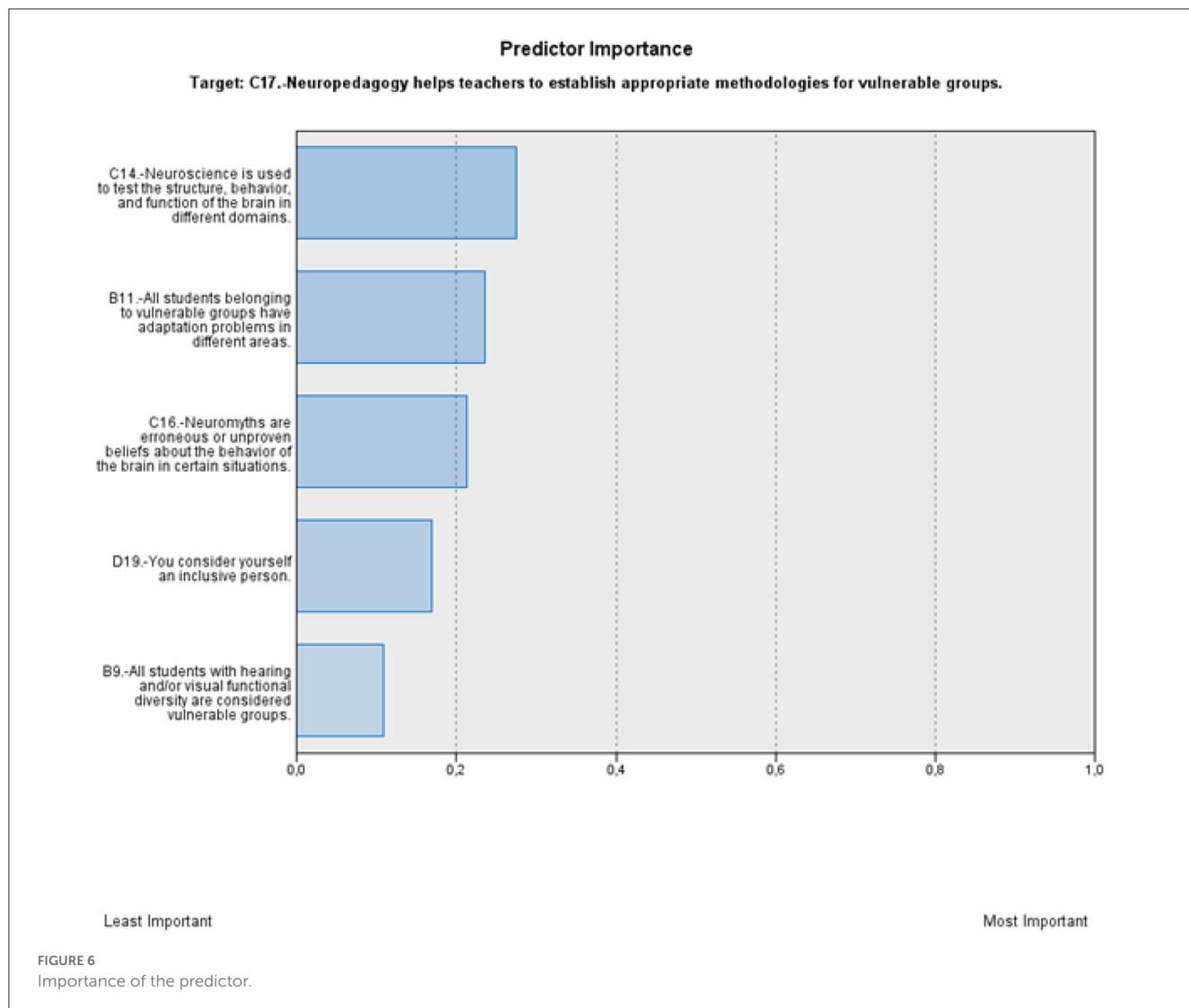
FIGURE 6
Importance of the predictor.

Figure 6 shows that neurodidactic helps the teacher establish appropriate methodologies for the vulnerable group. We must consider the students belonging to vulnerable groups in order of importance: C14, B11, C16, D19, and B9.

4. Discussion and conclusion

The presented research was conducted on a population of primary education graduates from the University of Jaén. In future research, it would be ideal to expand this research to university professors, as suggested by Castro et al. (2011), to assess their educational level and their interest in education and neurodidactics for improving the learning outcomes of vulnerable groups and promoting their inclusion. It would be useful to conduct similar research on education professionals in educational institutions to compare data between students and professionals in service, as mentioned by González and Zerpa (2007) in their study.

The descriptive analysis revealed that the participants strongly agreed (x=4.85) that students from vulnerable groups require,

in most cases, curricular adaptations. However, there is little agreement (=2.85 and 2.83) that Gypsy students and students with functional diversity feel included in classroom settings (Carmona et al., 2019). Neurodidactics and its adaptation in the educational field make learning for students belonging to vulnerable groups more efficient, as proposed in the initial hypothesis of the study, by providing a scientific basis for innovative educational practices. This, in turn, can help promote the inclusion of such students (De Barros and Hernández, 2022).

Teachers recognize the importance of neurodidactic implementations for students belonging to vulnerable groups. In the fields of Navas Luque and Cuadrado Guirado (2003), the inclusion of Gypsy students should begin with the teacher and continue with the inclusion of classmates.

With regard to the problem for which this research **was** carried out, it can be concluded that future teachers do not have high expectations of students belonging to vulnerable groups and believe that they do not feel included in their peer groups at schools. They lack sufficient training and knowledge in neurodidactics to work with these students effectively,

although they recognize its importance and functionality in the educational field.

The discovery of brain structures in children from vulnerable groups allows professionals and families to take appropriate actions to promote the effectiveness of educational and social interventions (Gaya and Salomó, 2019).

Finally, to provide a comprehensive understanding that complements the central idea of this research, we resorted to the data expressed by the regression analysis. Thus, based on the vulnerability of students and the objective of educating teachers about neurodidactics, the most critical factors to consider are arranged in order of importance:

1. The importance of neuroscience in education.
2. All students belonging to vulnerable groups have adaptation problems in different areas.
3. Neuromyths must be eliminated from the educational system.
4. We must have inclusive teachers.

Students with functional diversity should also be considered a vulnerable group.

With all these factors in mind, we conclude that providing training on "neuro" aspects could help prevent student dropout among students belonging to vulnerable groups (López-García, 2020).

5. Limitations of the study

Performing data analysis for this study required individuals skilled in programming knowledge.

The time of the research was very high since it was necessary to review each stage of the processes: it was necessary to develop pilot tests and programming knowledge to elaborate on the equestrian, work design, etc.

The number of participants in the sample was small (although representative) due to their lack of collaboration.

As a quantitative study, the research had to overlook the context's qualitative aspects. The study's quantitative nature means that there could be errors in interpreting the data, which is inevitable given the researchers' human qualities and skills.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Author contributions

Acknowledgments

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.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2023.1134732/full#supplementary-material

References

Abajo, J.E., and Carrasco, S. (2004). "Research Team on School Success of Gypsy Pupils," in *Experiences and trajectories of Gypsies in Spain: Crossroads on Education, Gender and Cultural Change*. Crown Heights, Medgar: Institute of Woman (MTAS) y CIDE (MEC), Colección Mujeres en la Educación. Available online at: https://web.archive.org/web/20161206021805/http://www.raco.cat:80/index.php/RecercaPensamentAnalisi/article/download/256250/343240 (accessed November 10, 2023).

Armstrong, D. (2005). *The Student's Guide to Writing Dissertations and Theses in Tourism Studies and Related Disciplines*. Pergamon.

Battro, A. M. (2016). *The Educated Brain: Essays in Neuroeducation*. Cambridge University Press.

Campoflor, A., Sauca, D., Trujillo, I., and Mosquera Moreno, L. E. (2016). Attention to diversity myth and tensions: from the teachers'vision of four

educational institutions del Departamento de Cauca. *Plumilla Educativa.* 17, 319–342. doi: 10.30554/plumillaedu.17.1764.2016

Campuzano, S. G., Pluas, I. M., and Bajaña, C. A., and Colamarco Nivas, W. G. (2019). Aplicación de neurociencia en el estudio del sistema nervioso. *Revista Científica de Investigación actualización del mundo de las Ciencias.* 3, 738–768. doi: 10.26820/reciamuc/3.(3).julio.2019.738-768

Carmona, J., García, M., Maiquez, M. L., and y Rodrigo, M. J. (2019). El impacto de las relaciones entre la familia y la escuela en la inclusión educativa de alumnos de etnia gitana: Una revisión sistemática. *REMIE.* 9, 319–348. doi: 10.17583/remie.2019.4666

Castro, M., Martínez, F., Navarro, G., and Pérez, J. (2011). El impacto de la tecnología en la educación. *Revista de Educación.* 25, 123–145.

De Barros, C., and Hernández, A. (2018). *Inclusión educativa: Bases neurocientíficas y tecnológicas en inclusión y transculturalidad.* Leicester, United Kingdom: Ifesi.

De Barros, C., and Hernández, A. (2022). Neuroscience, neuroeducation, neurodidactics and technology. *Texto Livre, Belo Horizonte-MG.* 15, e41235. doi: 10.35699/1983-3652.2022.40454

García Ferrando, M. (2015). *Sociología del deporte: Una introducción.* Alianza Editorial.

García, J. A. (2017). *La cultura del pueblo gitano en el currículo de la educación obligatoria, a través de su presencia, ausencia y percepción en los libros de texto.* MECD. Available online at: https://sede.educacion.gob.es/publiventa/la-cultura-del-pueblo-gitano-en-el-curriculo-de-la-educacion-obligatoria-a-traves-de-su-presencia-ausencia-y-percepcion-en-los-libros-de-texto/cultura-gitanos/22079 (accessed November 10, 2023).

Gaya, A., and Salomó, J, (2019). Innovación educativa en el siglo XXI. *Revista Internacional de Educación.* 12, 45-60.

Goleman, D. (2011). *Inteligencia emocional.* Barcelona: Editorial Kairós.

González, A., and Zerpa, R. (2007). Estrategias de enseñanza en el aula. *Revista de Psicología Educativa.* 12, 67–82.

Hernández, A. (2022). Neuropedagogy and neuroimaging. *Texto Livre, Belo Horizonte-MG.* 15, e40453, e42022. doi: 10.35699/1983-3652.2022.40453

Hernández, A. (2022). "Neurociencia, neuroeducación, neurodidáctica y tecnología," in *Texto Livre, Volumen 15*, eds C. D. En Barros and A. H. Fernández.

Hernández, A., and De Barros, C. (2016). El impacto de la tecnología en la educación. *Revista de Investigación Educativa.* 20, 85–100.

Hernández, A., and De Barros, C. (2021). Inclusión, atención a la diversidad y neuroeducación en Educación Física. *Retos: nuevas tendencias en educación física, deporte y recreación.* 41, 555–561. doi: 10.47197/retos.v0i41.86070

Iraosi, G. (2006). *El poder del diseño de una encuesta: guía del usuario para administrar encuestas, interpretar resultados e influir en los encuestados.* Washington, DC: The World Bank. Available online at: http://www.estadistica.mat.uson.mx/Material/etapas.pdf (accessed November 10, 2023).

Kaiser, R. T. (1974). The education of an American pragmatist: My empirical educational odyssey. *J. Exp. Educ.* 42, 1–9.

Llorent, V. J., and López-González, L. (2010). El papel de la familia en el rendimiento académico. *Revista de Psicología y Educación.* 18, 321–335.

Logan, J., Rozwell, C., and Redolar, D. (2014). The future of artificial intelligence in education. *J. Educ. Technol.* 8, 120–135.

López-García, B. (2020). *Neuroeducación: una interdisciplina utilizada en función del desarrollo integral de los alumnos [Tesis de grado].* Centro, Méx., Mexico: Escuela normal de Tecámac.

Malla, F., and Zabala, I. (1978). La previsión del futuro en la empresa (III): el método Delphi. *Estudios Empresariales.* 39, 13–24.

Manota, M. A., and Melendro, M. (2016). Clima de aula y buenas prácticas docentes con adolescentes vulnerables: más allá de los contenidos académicos. *Contextos educativos: Revista de educación.* 19, 55–74. doi: 10.18172/con.2756

Mayer, J. D., and Salovey, P. (1997). "What is emotional intelligence?," in *Emotional development and emotional intelligence: Educational implications*, Salovey, P., Sluyter, D. (eds.). New York, NY, EE. UU.: Basic Books. p. 3–31.

McMahon, F. J. (2016). Estudios de asociación genética en psiquiatría: Hora de la recompensa. *Lancet Psychiat.* 3, 309–310. doi: 10.1016/S2215-0366(16)00016-X

Mejía, E. (2005). *Metodología de la investigación científica.* Universidad Nacional Mayor de San Marco. Available online at: https://es.scribd.com/doc/181953104/Metodologia-de-la-Investigacion-Cientifica-Mejia-pdf (accessed January 21, 2023).

Mengual, S. (2011). *El ciberperiodismo en el cambio de siglo: calidad, competencia y convergencia.* Ediciones Fragua.

Miller, R. (2016). Neuroeducation: integrating brain-based psychoeducation into clinical practice. *J. Mental Health Counsel.* 38, 103–115. doi: 10.17744/mehc.38.2.02

Moreno, R. (2021). *Principles of Instructional Design.* Routledge.

Navas Luque, M., and Cuadrado Guirado, I. (2003). Impacto de la publicidad en el comportamiento del consumidor. *Revista de Marketing.* 5, 45–60.

Observatorio de la Infancia en Andalucía. (2020). *Estudio sobre la situación de la infancia en Andalucía.* Consejería de Igualdad, Políticas Sociales y Conciliación.

Paniagua, M. (2013). "Neurodidáctica: una nueva forma de hacer educación," in *Fides et Ratio*. Available online at: https://www.researchgate.net/publication/317528952_NEURODIDACTICA_UNA_NUEVA_FORMA_DE_HACER_EDUCACION (accessed November 10, 2023).

Parra-Díaz, J., VeraBachman, D., and Vanzella, S. M. (2019). Neuroeducación: ¿real aporte al aprendizaje o mito? *Salud pública de México.* 61, 3–4. doi: 10.21149/9277

Payarés, D. (2016). Neuroeducación a diálogo, neuromitos en el proceso de enseñanza-aprendizaje en la educación moral. *Pensamiento.* 73 941–958. doi: 10.14422/pen.v72.i273.y2016.010

Pherez, G., and Vargas, S., Jerez., J. (2018). Neuroaprendizaje, una propuesta educativa: herramientas para mejorar la praxis del docente. *Revista Civilizar.* 18, 149–166. doi: 10.22518/usergioa/jour/ccsh/2018.1/a10

Pinto, R., and Flores, M. (2022). La importancia de la comunicación en el ámbito laboral. *Revista de Comunicación Empresarial.* 15, 25–40.

Redolar, D. (2014). "Neurociencia cognitiva," in *Médica Panamericana*. Available online at: https://www.medicapanamericana.com/es/libro/neurociencia-cognitiva

Sahakian, B., and LaBuzetta, J. (2015). *Bad Moves: How Decision Making Goes Wrong, and theEthics of Smart Drugs.* Oxford: Oxford University Press.

Salles, A. (2013). On the normative implications of social neuroscience. *Recerca. Revista de PensamentiAnàlisi.* 13, 29–42. doi: 10.6035/Recerca.2013.13.3

Siegel, D. J. (2012). *Pocket guide to interpersonal neurobiology: An integrative handbook of the mind.* Norton. Available online at: https://www.amazon.es/Pocket-Guide-Interpersonal-Neurobiology-Integrative/dp/039370713X (accessed November 10, 2023).

Silberman, M. (2015). *Active Learning: 101 Strategies to Teach Any Subject.* Pearson.

Sims, S., Fletcher-Wood, H., O'Mara-Eves, A., Cottingham, S., Stansfield, C., Van Herwegen, J., et al. (2021). What are the Characteristics of Teacher Professional Development that Increase Pupil Achievement? A systematic review and meta-analysis. London: Education Endowment Foundation. Available online at: https://educationendowmentfoundation.org.uk/education-evidence/evidence-reviews/teacher-professional-development-characteristics (accessed November 10, 2023).

Soro Camat, E., Basil, C., and Rosell, C. (2012). *Pluridiscapacidad y contextos de intervención.* Barcelona: Institut de Ciències de l'Educació. Universitat de Barcelona.

Stroustrup, N., Alla, R., Ayyadevara, S., Pyatnitskiy, M., Menshikov, L., Reis, R., et al. (2016). The temporal scaling of Caenorhabditis elegansageing. *Nature.* 530, 103–107. doi: 10.1038/nature16550

Tonatiuh, L., and Anguiano, I. (2019). *El camino de Quetzalcóatl: un viaje al corazón de la conciencia.* Editorial Edaf.

Trenado, C., Pedroarena-Leal, N., and Ruge, D. (2021). Considering the role of neurodidactics in medical education as inspired by learning studies and music education. *Med. Sci. Educator.* 31, 267–272. doi: 10.1007/s40670-020-01176-9

Vega, M. (2022). *La educación inclusiva: fundamentos, teorías y prácticas.* Ediciones Aljibe.

Vidal, J., and Diaz, M. (2016). *Metodología de la investigación cualitativa: Fundamentos, métodos, técnicas y aplicaciones.* Editorial Médica Panamericana.

Check for updates

Psychometric properties of a dropout prediction tool for students in Andalusia

Antonio Hernández-Fernández[1†], Inmaculada Ávalos-Ruiz[2*†] and Antonio Pantoja-Vallejo[1†]

[1]Department of Pedagogy, University of Jaén, Jaén, Spain, [2]Department of Research Methods and Diagnosis in Education, University of Granada, Granada, Spain

This article analyzes the psychometric properties of the scale used in the research corresponding to the topic "Stories of Abandonment. A Biographical-Narrative Approach to the Academic Dropout in Andalusian Universities. Multicausal Analysis and Proposals for Prevention." The scale is composed of 71 items, with five Likert-type response alternatives. The participants forming the convenience sample were 970 from six Spanish universities. The study dimensions are: A.-Motivation, B.-Commitment, C.-Attitude and behavior, D.-Socioeconomic conditions, and finally E.-Permanence. The study begins by calculating the statistical power and the effect size, thus determining the type I and type II error. Similarly, reliability has been calculated based on the intercorrelation of items through Cronbach's alpha (0.906). The construct validity was carried out through exploratory factor analysis, for which the correlation matrix was studied using the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO coefficient), in this case the value is 0.886, the result of Bartlett's test of sphericity is 0.000 and the Determinant $4.009E^{-12}$, so we continue with the analysis of the correlational structure, extracting the factors through the principal components method and determining in this way the communalities with the highest and lowest values. Next, we calculated the total variance explained, obtaining 16 factors and an accumulated variance of 57.315%. Finally, the model was determined by distributing the items according to the highest level of saturation by factors, obtaining a 30-item scale with a Cronbach's alpha of 0.893, which is reliable. In conclusion, the questionnaire used complies with the psychometric aspects necessary to be an optimal scale.

KEYWORDS

psychometrics, questionnaire, dropout, dropout prediction, university

1. Introduction

One of the main problems of the university system, both internationally and nationally, is the dropout of university students before completing their studies. However, this problem does not only affect the system itself, but also involves damage to the development of a society's human capital (Rué, 2014), in addition to generating a high economic cost for public accounts (Colás, 2015). These issues already justify the need to understand university dropout as a phenomenon on which it is necessary to intervene and understand its causes in order to generate strategies to prevent or reduce it.

The project in which this work is framed focuses on the dropout rate of the system, without considering the dropout rate of each degree in particular or the rate of change of degree. With

the application of the analyzed instrument it is intended to detect the presence or absence of variables that may lead to dropout from the university system. With regard to the variables that influence this issue, Velázquez and González (2017) establish four factors to be taken into account:

1) motivation,
2) commitment,
3) attitudes and behavior,
4) social and economic conditions.

It should be noted that in this study, university dropout is considered to be a situation in which, without having completed university studies, a period of two academic years is allowed to pass without enrolling in the official degree program or in a different one.

Turning to psychometric issues, it should be noted that Sánchez et al. (2011), analyzing the Neyman-Pearson lemma, point out that in any study there are two opposing hypotheses, a null and an alternative hypothesis, in our case that the subject is or is not at risk of dropping out of university studies, and this gives us two possible errors. The authors define Type I error as that which is committed by rejecting a null hypothesis that is in fact correct, while Type II error is defined as that which is committed by accepting a null hypothesis that is in fact false.

On the other hand, reliability, according to Prieto and Delgado (2010), refers to the consistency or stability of the measurements in case of repeating the measurement process. According to the authors, the lower the variability between different measurements under similar conditions, the higher the reliability of the instrument.

Regarding to validity, Ávalos (2022) lists the three types of validity that any measurement instrument in order to be considered optimal:

a) Construct validity. This refers to the precision of the definition of the behavior, trait or characteristic to be measured and the adaptation and suitability of the instrument used to provide evidence that allows the measurement of said behavior, trait or characteristic. Construct validity should be carried out through expert judgment.

b) Content validity. It is considered to have been explicated to the extent that the items that make up the instrument are representative of the number of behaviors and traits that are intended to be detected. Content validity is usually corroborated by expert judgment and application of Kappa coefficient análisis, but this is not the only way.

c) Criterion validity. It can be concurrent or predictive and is considered acquired when the instrument to be validated is applied together with others that measure the same thing, and that have already achieved validity, and similar results are obtained. For criterion validity, analyses of sensitivity, specificity, positive predictive value, negative predictive value, proportion of false positives, proportion of false negatives and percentage of coincidence are usually carried out.

By means of the present text, the results obtained after performing the psychometric analysis of one of the instruments used in the aforementioned Project are shown, specifically the questionnaire on successful student permanence by Velázquez and González (2017).

This work provides a smaller instrument that requires less time for its application with high reliability.

2. Materials and methods

The research "Stories of Abandonment. A Biographical-Narrative Approach to the Academic Dropout in Andalusian Universities. Multicausal Analysis and Proposals for Prevention" follows a quantitative, non-experimental and descriptive methodology. In this work, the narrative methodology has not been dealt with, since the object of research is centered on the questionnaire. Quadrants were made with the different degrees to which the research team had Access (the quadrants are not shown, due to their extensión), either by teaching or by being able to access through a colleague, trying to cover the largest possible number of degrees. Thus, a sample of 970 students from four Spanish universities (University of Granada - Granada Campus, University of Granada - Ceuta Campus, University of Jaén, Pablo de Olavide University and University of Seville) was obtained, with participants from 12 different degrees and 7 double degrees (Degree in Early Childhood Education, Degree in Social Education, Degree in Primary Education, Degree in Nursing, Degree in Physical Activity and Sports Sciences, Degree in Physiotherapy, Degree in Business Administration and Management, Degree in Telecommunications Technology Engineering, Degree in Environmental Sciences, Degree in Criminology, Degree in Pedagogy, Degree in Industrial Electronic Engineering, Double Degree in Business Administration and Management and Law, Double Degree in Environmental Sciences and Agricultural Engineering, Double Degree in English Studies and Primary Education, Double Degree in Environmental Sciences and Geography and History, Double Degree in Law and International Relations, Double Degree in Geography and History and International Relations and Double Degree in Translation and Interpretation and International Relations).

For data collection, the Velázquez and González (2017) scale is used, composed of 71 items, with five Likert-type response alternatives, grouped into 4 factors: motivation, commitment, attitudes and behavior, and social and economic conditions, to which the permanence factor was added after factor analysis.

The psychometric analysis of this study begins with the analysis of Type I and II errors as well as the statistical power of the research. Reliability will then be determined based on item intercorrelation, concluding with content and construct validity.

3. Results

The first results come from establishing that the research design should consider the sample size and the statistical power that would be achieved with it (Cardenas and Arancibia, 2016). In this way, the type I and type II error is determined, represented in Figure 1.

The statistical power of this research is the complement of the type II error probability, that is, the probability of erroneously accepting the null hypothesis (Cohen, 1992). In this case the effect size is 0.25, and the power is 95%. Following (Cardenas and Arancibia (2016), the power should be higher than 80%, showing a correct validity (see Figure 2).
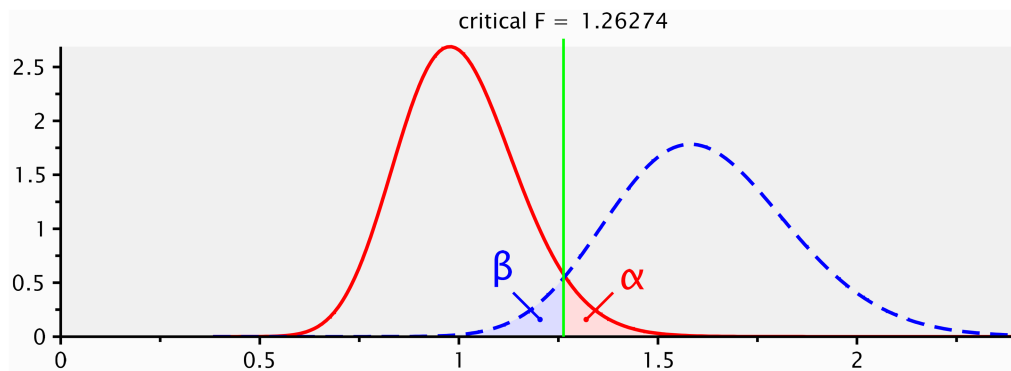
FIGURE 1
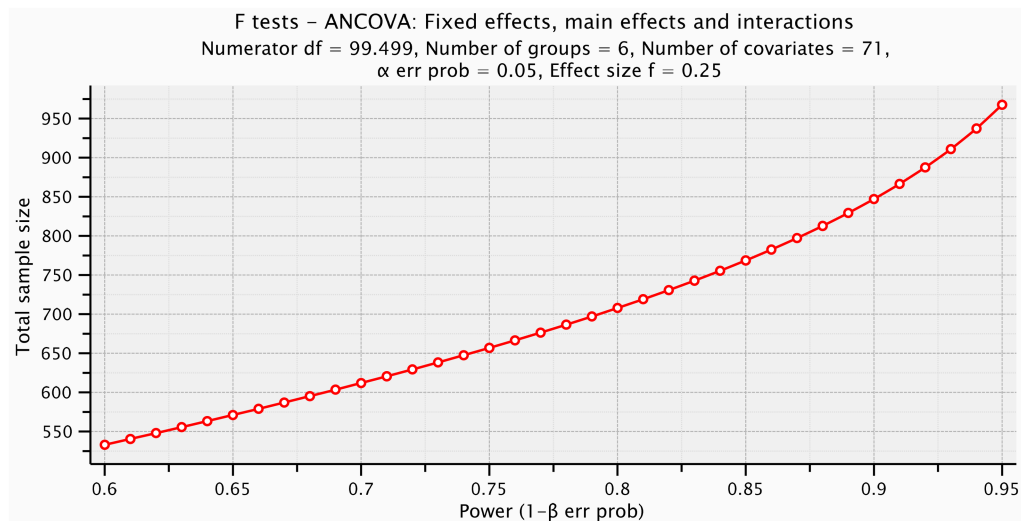Representation of type I and II errors. Own source.

FIGURE 2
Sample and statistical power. Own source.

First of all, reliability was calculated based on the intercorrelation of items through Cronbach's alpha (0.906), which according to George and Mallery (2003) can be considered excellent (see Table 1).

The calculation was carried out with the SPSS software, and the cut-off points taken into account are those established by George and Mallery (2003).

Next, we proceeded to investigate the content validity, which was carried out by fifteen PhD specialists (Malla and Zabala, 1978) authorized to perform this evaluation and belonging to different universities. Their competence coefficient was calculated to be $k = 0.9$, which shows a high level of competence (Mengual, 2011). After analyzing the validation questionnaires, some questions were readjusted, without affecting the substance of the question. On the other hand, a pilot test was carried out on a subgroup of the sample to review comprehension difficulties, identify questions that generated doubt, etc., the corresponding checklist was used (Iraossi, 2006). The results of the pilot test were satisfactory and the instrument was validated in its content.

The construct validity has been carried out through exploratory factor analysis, for which the correlation matrix has been studied using the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO coefficient), in this case the value is 0.886, following Kaiser (1974) the value is very good, the result of Bartlett's test of sphericity is 0.000 and the Determinant $4.009E^{-12}$, so we continue with the analysis of the structure of the correctives (see Table 2).

Next, the factors are extracted through the principal components method, thus determining the communalities with the highest and lowest values.

The items with the highest extraction value are:

B22: I have passed all my subjects during my college career (0.799).
C45: Communication between me and my family members is positive and open (0.779).
I feel accepted and valued by my peers (0.769).
I feel totally integrated into my group (0.764).
B24: I have passed my subjects within the regular A (0.722).

The items with the lowest extraction value are:

B25: If I find a subject difficult, I consult additional bibliography or seek advice to clear my doubts (0.394).

4. C47: I identify my parents as authority figures (0.408).

The total variance explained was calculated, obtaining 16 factors and a cumulative variance of 57.315%.

Finally, the model was determined by distributing the items according to the highest level of saturation by factors, obtaining a 30-item scale with a Cronbach's alpha of 0.893, which is high.

- Dimension A: A1, A13, A14, A15, A16, A17.

TABLE 1 Reliability statistics.

Cronbach's alpha	N of elements
.906	

Own source.

TABLE 2 KMO and bartlett test.

Kaiser-Meyer-Olkin measure of sampling adequacy		0.886
Bartlett's test for sphericity	Approx. chi-square	19,642,437
	gl	2,485
	Sig.	0.000

Own source.

- Dimension B: B18, B20, B2, B28, B3, B34.
- Dimension C: C42, C44, C45, C46, C48, C49, C50, C51, C52, C53, C54, C55, C56, C57, C60.
- Dimension D: D61.
- E-dimension: E6, E71.

4. Discussion

Given the relevance of the phenomenon generated by university dropout at the international level, both in terms of social development and economic issues, it is necessary to analyze the problem in order to detect the causes that lead to it and, in this way, have the option of making intervention proposals aimed at reducing university dropout rates (see Table 3).

One of the necessary steps in a study of these characteristics is the analysis of instruments that can shed light and make it possible to anticipate the occurrence of a university dropout situation. The instrument selected for this purpose has been analyzed psychometrically, offering positive results. Firstly, in relation to the sample that made up the study, it was adequate. The higher the number of participants, the greater the power, as indicated by Bono and Arnau (1995), who add that power is determined by the ability to commit a Type II error. The results of this study show that a statistical power of 95% has been obtained, which is very satisfactory in this sense.

Turning to the reliability of the scale, it should be noted that in its original version it already had a high reliability, but given the change

TABLE 3 Total variance explained.

Component	Initial eigenvalues			Sums of loads squared by extraction			Sums of loads squared by rotation		
	Total	% variance	Accumulated	Total	% variance	Accumulated	Total	% variance	Accumulated
1	10.917	15.376	15.376	10.917	15.376	15.376	4.288	6.040	6.040
	4.340	6.112	21.488	4.340	6.112	21.488	4.129	5.815	11.855
	3.653	5.145	26.633	3.653	5.145	26.633	3.612	5.088	16.943
	3.096	4.361	30.994	3.096	4.361	30.994	3.587	5.052	21.995
5	2.473	3.483	34.477	2.473	3.483	34.477	3.258	4.588	26.583
	2.250	3.169	37.646	2.250	3.169	37.646	2.852	4.018	30.601
	2.028	2.856	40.501	2.028	2.856	40.501	2.778	3.913	34.513
	1,998	2,814	43,315	1,998	2,814	43,315	2,570	3,620	38,133
	1,607	2,263	45,578	1,607	2,263	45,578	2,198	3,096	41,229
	1,445	2,036	47,614	1,445	2,036	47,614	2,055	2,894	44,123
	1,272	1,792	49,405	1,272	1,792	49,405	1,988	2,800	46,923
	1,246	1,755	51,160	1,246	1,755	51,160	1,593	2,244	49,167
	1,177	1,658	52,817	1.177	1.658	52.817	1.519	2.139	51.307
	1.100	1.549	54.366	1.100	1.549	54.366	1.496	2.107	53.414
	1.067	1.503	55.870	1.067	1.503	55.870	1.390	1.958	55.372
	1.026	1.446	57.315	1.026	1.446	57.315	1.380	1.943	57.315
	.988	1.391	58.706						

Own source.
Extraction method: principal component analysis.

of context, it was decided to analyze the construct. This allowed us to know the weight of the items, which puts us in a position to highlight the relevance of issues such as the trajectory in the university and in studies in general, the communication that exists between the members of the family, the acceptance by the rest of the peers and the feeling of integration in the group.

Knowing these data has made it possible to reduce the number of items that make up the instrument, while maintaining good reliability. Thus, we have gone from having an instrument composed of 71 items to a questionnaire with a total of 30 items. The reliability obtained with this new version of the scale translates into a Cronbach's alpha of 0.893, which indicates that the level of reliability remains high.

With all the data provided, we can affirm that a new version of the Velázquez and González (2017) successful student permanence questionnaire has been obtained. This new version has good statistical power, is shorter, since the number of items has been reduced, and offers a good level of reliability, which allows us to affirm that it is an ideal instrument for trying to anticipate possible situations of dropping out of university studies. This instrument is an effective tool for researchers and people interested in obtaining information on the subject in a reliable way.

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

The studies involving human participants were reviewed and approved by University of Granada. 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.

Funding

Acknowledgments

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.

The handling editor CDBC declared a past collaboration with the author AH-F.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

Ávalos, I. (2022). *Development and validation of a screening instrument for the assessment and diagnosis of minors at risk of social exclusion.* Doctoral thesis. University of Granada. Spain

Bono, R., and Arnau, J. (1995). General considerations on power studies. *Ann. Psychol.* 11, 193–202.

Cardenas, J. M., and Arancibia, H. (2016). Statistical power and effect size calculation in G*power: complements to statistical significance testing and its application in psychology. *Health Soc.* 5, 210–244. doi: 10.22199/S07187475.2014.0002.00006

Colás, P. (2015). University dropout. *Revista Fuentes* 16, 9–14. doi: 10.12795/revistafuentes.2015.i16

Cohen, J. (1992). Statistical power analysis. *Curr. Dir. Psychol. Sci.* 1, 98–101. doi: 10.1111/1467-8721

George, D., and Mallery, P. (2003). *Using SPSS for windows step by step: A simple guide and reference* (4th). Pearson Education. Noida

Iraossi, G. (2006). *The power of survey design: A user's guide for managing surveys, interpreting results, and influencing respondents.* The World Bank, Washington

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika* 39, 31–36. doi: 10.1007/BF02291575

Malla, F. G., and Zabala, (1978). Forecasting the future in the firm (III): the Delphi method. *Estudios Empresariales* 39, 13–24.

Mengual, S. (2011). *The importance perceived by faculty and students on the inclusion of digital competence in higher education. An analysis in sciences of physical activity and sport at the University of Alicante.* Doctoral thesis. University of Alicante. Spain

Prieto, G., and Delgado, A. R. (2010). Reliability and validity. *Papeles del Psicólogo* 31, 67–74.

Rué, J. (2014). University dropout: variables, frameworks and quality policies REDU. *Revista de Docencia Universitaria* 12, 281–306.

Sánchez, C., Cortiñas, P., and Tejera, I. (2011). "Hypothesis testing: fisher and Neyman-Pearson trends" in *History of probability and statistics (V)*. eds. J. M. Riobóo and I. Riobóo. Xunta de Galicia.

Velázquez, Y., and González, M. A. (2017). Factors associated with the permanence of university students: case UAMM-UAT. *J. High. Educ.* 46, 117–138. doi: 10.1016/j.resu.2017.11.003

| Frontiers in Education

Check for updates

Dropout in Andalusian universities: prediction and prevention

Manuel Fernández Cruz*, Daniel Álvarez Ferrándiz,
F. Borja Fernández García-Valdecasas and
Esther González Castellón

ProfesioLab Group (SEJ059), University of Granada, Granada, Spain

Problem and objective: University dropout is a major problem that affects more than 31,000 students each year in Andalusian universities, with serious personal and social consequences and an economic cost of more than 222 million euros for the region's public administration. As concluded from the review of explanatory models we reviewed, dropout has a multicausal origin. The purpose of our work is to test the efficacy of the use of a screening for the early detection of the risk of academic dropout in Higher Education in Andalusian universities.

Procedure: We applied a screening instrument adapted for incoming students in public universities in Andalusia. The survey was applied at the beginning of the second semester. In this article we present data from a sample composed of 976 subjects from the universities of Granada UGR, Jaén UJA and Pablo de Olavide de Sevilla UPO.

Results: With the data obtained we have established the dropout risk group, which includes those students who do not reach an average score of 3.00 in the total screening. There are 34 students representing 3.48% of the sample. Of these 34 students, 26 are women and 8 are men; 20 belong to the UGR, 8 to the UJA and 5 to the UPO. The detection of the risk group will allow the universities to apply preventive measures in a personalized and adjusted way to avoid possible dropout.

1 Introduction

Academic dropout is a very important problem in higher education with very negative social and personal consequences. There are many personal situations of a student that can be included in the concept of dropout: change of undergraduate degree, transfer of university, temporary pause in studies and total abandonment of the classroom and the university system. In this article we are going to focus on total dropout, which the Spanish Ministry of Universities of the Government of Spain (2022) defines as the situation of a student who has not graduated on time and is not enrolled in his or her undergraduate degree or in any other degree program at any other university for two consecutive years, so that the student has been left out of the system.

Consistent with this definition, the university system dropout rate is measured as the percentage of students in a cohort who, in year "X" in which they should have graduated, have not obtained their diploma and have not enrolled in any university degree program at in any university for two consecutive years (Ministry of Universities of the Government of Spain, 2022).

The dropout rate is excessively high in developed countries. International organizations such as the OECD (2019) put it at around 20%. The EU indicates for Spain a value that fluctuates around 18% of all university students: bachelor's and master's degrees (Eurostat, 2020).

The official data collected in the successive annual reports of Data and Figures of the Spanish University System published by the Government show the evolution of the phenomenon. Specifically, in the 2021 academic year, the rate rises to 13% of undergraduate students (Ministry of Universities of the Government of Spain, 2022). And a double-digit rate is highly worrisome for the University System. That 13% represents a total of 169,000 students who have dropped out of the system throughout Spain of which 31,850 correspond to universities in Andalusia (Ministry of Universities of the Government of Spain, 2022). If we estimate that the state was investing in 2021 about 7,000 euros per year per university position, the cost of dropout (as calculated by Colás Bravo, 2015) is amounting to a total of 1,183 million euros per year in Spain, of which 222 million euros correspond to Andalusia. These figures are lower than those estimated for the United States (Rumberger, 2020) and other regions of the world. Even so, they are unbearable.

In addition to the high economic impact, the negative effects are felt in job training, retraining, social and community assistance programs that must be put in place to care for unemployed young people and even those with social adaptation difficulties.

The social consequences of dropout are closely linked to the personal consequences: feelings of failure, depression, maladjustment or difficulty in finding a quality job in the immediate future.

As it is such a broad and widespread problem with pernicious consequences, many studies are converging to provide knowledge on the phenomenon and its causes (Aina et al., 2022). In his systematic review on the subject, Aljohani (2016) finds six theoretical models that try to explain the causes of dropout and to find the factors of persistence in study that are successful in retaining students.

Spady's (1970) "Undergraduate Dropout Process" model is based on the assumptions (1) that satisfaction with the college experience will depend on the social and academic rewards available, and (2) that maintaining commitment to college requires both integration into the system and a significant number of positive rewards (academic or social). This theory is based on the idea of student interoperability with the academic system and the social system.

Tinto (1975) developed his "Institutional Departure Model" as an explanatory model of dropout in American universities and is based on a social integration perspective, attributing the cause of dropout to the interaction between the student's personal attributes and the organizational structures of the institutions. Adjusting the above model for the European context, Heublein et al. (2003) include extra-university contextual factors, such as economic situation, living conditions, family support, and academic and professional guidance received, as causes that influence persistence in the face of dropping out of university studies.

Bean's (1980) "Student Attrition Model" attempts to create a direct causal pathway so that administrators can point to a specific variable indicating why students drop out. Among the variables studied that

influence a student's decision to persist in studies are: positive GPA, satisfaction with the institution, perceived added value of the education received, opportunities for participation in student life, and adequate organizational norms for effective integration.

With the "Student-Faculty Informal Contact Model," Pascarella (1980) assumed that a more informal interaction of students with faculty could increase the level of their institutional commitment and, consequently, minimize the risk of dropout. Pascarella (1980) constructed his model of informal student-faculty contact by examining the dimensions: context, exposure, focus, and impact.

Meanwhile, in their "Non-traditional Student Attrition Model," Bean and Metzner (1985) argue that, while previous models have emphasized the important role of social integration within the academic institution in the student persistence process, this factor has minimal impact on non-traditional students. Rather, nontraditional students appear to be affected primarily by environmental factors, such as family commitments and other external responsibilities.

The "Integrated Model of Student Retention" (Cabrera et al., 1993) analyzes all the statistically confirmed variables of the previous theories, while excluding from the model those that were not validated in the initial analysis and, in addition, merges similar constructs. Thus, the constructs "courses" and "institutional adequacy and quality" from Bean's (1980) theoretical model are merged with the constructs "academic integration" and "institutional commitments" from Tinto's theoretical model, respectively. In addition, some indicator variables were extracted from their original constructs and included in the current model as independent variables. For example, in their statistical analysis, Cabrera et al. (1993) found that the variable "GPA," considered in Tinto's model as an indicator variable of the construct "academic integration," had a status equivalent to the construct "parent." Finally, the variables "financial attitudes" and "encouragement from friends and family" from the construct "environment" of Bean's theoretical model were included in his model as independent variables because they were found to significantly affect academic integration, institutional commitments, and the persistence decision.

Along with these six classic models, we find other explanatory theories of dropout such as the Theory of Student Involvement (Astin, 1975) which refers to the "quantity and quality of physical and psychological energy that students invest in the college experience" (p. 307). Astin postulated that the degree to which students are involved in college is positively related to their degree of learning and personal development. More recently, Kehm et al. (2019), point out the nine factors that, in their opinion, influence dropout: academic integration, social integration, personal efforts and motivations to study, admission information and requirements, previous academic performance in school, the student's personal characteristics, the student's sociodemographic background, and external conditions. Among these external conditions are: the economic situation and the need to make studies compatible with work, even if it is part-time (Argentin and Triventi, 2011).

With his systematic review, Barroso et al. (2022) makes a conceptual map of the factors involved in dropout: (1) Input attributes (mother's academic level, family economic level, gender, mental health, previous academic path); (2) Goals and commitment (self-efficacy, autonomy, motivation, perspectives); (3) Institutional experiences (academic capacity, time dedicated to study, interaction with peers, extracurricular activities); (4) Academic and social integration (satisfaction, perceived social support); and (5) Measures

of identification of risk groups (use of screening, analytical learning, data mining, preventive measures).

We draw attention to the fourth factor referring to proactive institutional intervention in diagnosis and preventive intervention with risk groups, which is the one we focus on in this article. Considerations on the prediction of the phenomenon and the conditions of preventive actions are relevant to this study.

The identification and preventive intervention with students at risk of dropping out has been addressed by Ambiel (2015) who presented a study of construction and validation of the Higher Education Dropout Motivation Scale that considers risk factors and leads to an assessment of institutional, personal, interpersonal and professional motivations, autonomy, social support and academic performance. On the other hand, Lin and Tang (2015) report the construction of a dropout alert system in higher education using data mining strategies. de Oliveira et al. (2021) employs AL Analytic Learning, a strategy that relies on the availability of large amounts of student data (demographic information, grades, behaviors in information systems, grades, behaviors in learning management systems, etc.), to exemplify changes in the way educational institutions use data to address student retention, dropout, and success issues, and focus on the needs of individual students in a personalized, data-driven manner.

This system is used by Ortigosa et al. (2019) with their SPA (Dropout Prediction System), an early warning system that uses these algorithmic models to generate static predictions of early dropout risk and periodically updated dynamic predictions. The goal of its work is to prevent student dropout through retention actions focused on the most at-risk students, seeking to maximize the effectiveness of institutional efforts in this regard. It also supports the recording of the resulting retention-oriented interventions for subsequent analysis.

According to a study by Martínez-López et al. (2023), the use of data mining techniques makes it possible to identify dropout risk indicators in university students. By analyzing academic and sociodemographic factors, predictive patterns of dropout can be detected (Martínez-López et al., 2023).

On the other hand, Moreno-Candil et al. (2022) point out that implementing early warning systems and comprehensive monitoring of vulnerable students is a key strategy for prevention. Timely detection and support can avoid situations of academic failure (Moreno-Candil et al., 2022).

Likewise, Moreno-Guerrero et al. (2022) emphasize the importance of offering socioemotional support within preventive actions. The strengthening of soft skills and sense of institutional belonging reinforces the motivation and commitment of students (Moreno-Guerrero et al., 2022).

In short, we have seen how the phenomenon of university dropout has been studied from different disciplines: psychology (Bakker et al., 2020), sociology (Samuel and Burger, 2020) and economics (Aina et al., 2022). Each of these disciplines points to specific mechanisms and determinants of students' decisions and achievements. But what is certain is that the models work in an integrated manner and provide a multicausal explanation to the phenomenon (López-Cózar et al., 2020). It is clear, therefore, that to address the prediction of school dropout, as we intend to do in this study, we will have to pay attention to dimensions such as: the student's personality; the structures available for social integration; the investment in time, money and effort that the student must make to enter, persist and complete their

studies; the possible existence of institutional mechanisms for reception and tutorial and academic support; vocational aspects; as well as the effectiveness of the instructional model offered to students and the neurodidactic factors involved (Álvarez et al., 2022).

2 Objectives

In this article, we address dropout as a definitive cause of the absence or weakness in the factors that favor persistence. Thus, we understand that weakness in the factors whose strength causes persistence leads to dropout. The purpose of our work is to test the effectiveness of the use of a screening for the early detection of the risk of academic dropout in Higher Education in Andalusian universities.

To achieve this purpose we set the following objectives:

(1) To select a screening instrument to detect the risk of dropping out of university studies.
(2) To apply the instrument to a large sample of students from public universities in Andalusia.
(3) To describe the dropout risk group and compare it with the total sample.

3 Methods

3.1 Design and process

The use of screening instruments to diagnose dropout in universities is increasingly common (Casanova et al., 2021). In this study we applied a screening instrument adapted from Velázquez and González (2017) for incoming students in public universities in Andalusia in order to delimit the risk group and provide data on that would allow institutions to develop policies and adjust actions for immediate attention. The design that is non-experimental, descriptive, explanatory and correlational.

The sample was accessed in 2021 through the opportunity provided by the professors in charge of teaching the second semester of the first course of any degree. For reasons of convenience, the application of the instrument was initiated at the Universities of Granada (UGR), Jaén (UJA) and Pablo de Olavide de Sevilla (UPO).

3.2 Sample

The sample is composed of 976 subjects. Of the 970 who identified their gender, 755 were women (77.35%) and 215 were men (22.02%). Out of the total, 642 study at the University of Granada (65.77%), 260 at the University of Jaén (26.63%) and 73 at the Pablo de Olavide University in Seville (7.47%), with one student not answering to which university he/she belonged. The students belong to a wide range of programs taught at the Andalusian universities mentioned: from Primary Education studies, which reaches the highest level of presence in the sample with 34.3%, to Criminology or different Engineering programs, which have one or more representatives in the sample. The subjects belong to the first year of the different undergraduate courses.

The instrument was applied to the students at the beginning of the second semester of their university studies. The students were contacted through their professors. For this purpose, a request for collaboration was sent to all professors with classes in the second semester of studies at the Universities of Granada, Jaén and Pablo Olavide in Seville.

3.3 Instrument

For the diagnosis of subjects at risk of dropping out, we have used the "Survey on successful student retention" by Velázquez and González (2017) validated, in the first instance, by applying it to a population of nursing students from the Matamoros Multidisciplinary Academic Unit of the Autonomous University of Tamaulipas and which we have adapted to the academic context of the Spanish university (Álvarez et al., 2022). This survey has been slightly modified in the wording of the items to adapt it to the Spanish student reality, and two of the initial 73 items have been eliminated because they were not considered applicable in our context. In its final application format, the survey consists of 71 items and 6 questions for the sociodemographic identification of the student. The survey takes the form of a five-point Likert-type scale in which the student expresses their degree of agreement or disagreement with the opinion expressed.

Although it already had an excellent content validation, the instrument was again submitted to a content evaluation, with the participation of 12 judges, with the rank of PhD and specialists in the subject (professionalism coefficient $k = 0.9$), who provided some suggestions on the form of the items. Similarly, a pilot test was carried out using a sample group, from which slight changes were made in the formulation of some items (two in particular), without affecting the structural basis of the items.

The usefulness of using this survey on persistence in studies to diagnose at-risk groups is evident: to the extent that the factors shown to be effective for persistence do not appear in a student, he/she belongs to the at-risk group and is a candidate for corrective measures that enhance the persistence factors and decrease the predictors of dropout (Boyraz et al., 2013). In addition, the survey is easy to apply by the professors themselves in the classroom, which makes it an excellent screening system.

The original survey establishes five dimensions of university studies:

    A. -Motivation;

    B. -Commitment;

    C. -Attitude and behavior;

    D. -Socioeconomic conditions;

    E. -Continuity.

These dimensions group 10 categories that, according to the authors, represent the theoretical model of persistence vs. dropping out of university studies (Table 1).

3.4 Data processing and analysis

With the data collected, we performed a descriptive analysis, a correlation analysis between dimensions using Spearman's Rho coefficient and an analysis of variance using the Kruskall-Wallis test to study the distribution of each dimension by university. The results of the descriptive analysis were used to make the sensitivity and specificity decisions necessary to estimate the risk group. The following software was used: SPSS V22.0.

4 Results

4.1 Descriptives

The descriptive analysis of the data shows that all dimensions (Table 1) receive a mean score above 3.00, therefore positive. Dimension C-Attitude and behavior has the highest mean (4.35), followed by dimensions E-Continuity (4.11), D-Socio-economic conditions (4.09), B-Commitment (3.88). Dimension A-Motivation has the lowest mean (3.86). The data distribution, as will be seen below, is not normal, so the median should be taken as the main statistic; however, since both coincide, the mean has been shown as the preferred statistic.

The overall mean score achieved by the set of all the items of the entire sample is 3.83, i.e., the student population surveyed seems to be oriented toward persistence in the studies rather than toward dropping out. However, there are seven items that do not reach the mean score of 3.00, i.e., they indicate a certain level of

TABLE 1 Dimensions and category of the survey on persistence in university studies.

Dimension/items	Categories
A.- Motivation (1–17)	Internal
	External
B.- Commitment (18–41)	For the institution
	Personal
C.- Attitude and behavior (42–60)	Academic integration
D.- Socioeconomic conditions (61–64)	Social and family interaction
	Economic conditions
E.- Continuity (65–71)	Successful completion of subjects
	Regular attendance
	Uninterrupted academic path

Source: Velázquez and González (2017).

dissatisfaction with the personal situation in the degree program. These items are presented in Table 2.

Of the seven items not oriented to persistence, three of them, 37, 26 and 19 belong to dimension B.- Commitment, while the other four items (2, 4, 7, and 6) refer to dimension A.-Motivation.

As we had already discussed in Table 3, motivation and commitment are the traits that stand out the least in the students surveyed.

4.2 Correlations between dimensions

To calculate the correlation between dimensions, the Kruskal-Wallis test was previously applied, since there were more than three samples, with the result that the data distribution was not normal, so we proceeded to study the correlation between dimensions using Spearman's Rho coefficient, obtaining the results shown in Table 4.

Table 4 shows the two-by-two correlations of all dimensions. All pairs correlate positively and significantly at level 0.01 (bilateral). These correlations vary in degree of significance. Moderately significant are the correlations (Rho between 0.40 and 0.59) between dimensions A/B (Motivation and Commitment) with a coefficient of 0.563; A/C (Motivation and Attitude and Behavior) with a coefficient of 0.412; and B/C (Commitment and Attitude and Behavior) with a coefficient of 0.431. The dimensions B/E (Attitude and Behavior and Continuity) with coefficient 0.378; C/E (Attitude and Behavior and Continuity) with

coefficient 0.373; C/D (Attitude and Behavior and Socioeconomic Conditions) with coefficient 0.352; D/E (Socioeconomic Conditions with Continuity) with coefficient 0.342 appear with a low significant minor correlation (Rho between 0.20 and 0.39); A/E (Motivation with Continuity) with coefficient 0.272; and B/D (Commitment and Socioeconomic Conditions) with coefficient 0.254; Finally, we consider that the correlation A/D (Motivation and Socioeconomic Conditions) with coefficient 0.157, is a very insignificant correlation (Rho greater than 0.00 and up to 0.19).

We have studied the effect that belonging to a different university has on each dimension. To do this, we performed the Kruskal-Wallis test, finding that there are two dimensions that correlate positively with the university variable. These are dimensions A.-Motivation and E.-Continuity with values of 0.007 and 0.012 respectively, as shown in Table 5. Both are significant at a confidence level of 95%.

Studying dimension A.-Motivation (Tables 6, 7), we find that the responses differ between UPO and UGR students, as well as between UPO and UJA students, while there are no significant differences in the responses given by UGR and UJA students. The motivation to persist among UPO students is lower than that of students from other universities and, therefore, the dropout rate at UPO is more likely to be higher.

Each row tests the null hypothesis that the distributions of the UPO/UGR/UJA subsamples taken in pairs, two by two, are equal. Asymptotic significances (bilateral tests) are shown. The significance

TABLE 2 Lowest scoring items in la muestra general.

No	Item	Dimension	Mean
37	The program coordinator takes action to ensure there are no free hours between classes.	B.- Commitment	2.47
2	My professors use assessment strategies that favor my creativity.	A.- Motivation	2.77
26	I consider my undergraduate courses not too difficult.	B.- Commitment	2.80
4	My lecturers care about my work in class.	A.- Motivation	2.82
7	In general, I feel motivated by my professors.	A.- Motivation	2.88
6	I feel that my effort is recognized by my professors.	A.- Motivation	2.92
19	I participate actively in class	B.- Commitment	2.97

Source: FEDER B-SEJ-516-UGR18.

TABLE 3 Descriptive data by dimension.

	A Motivation	B Commitment	C Attitude and behavior	D Socio-economic conditions	E Continuity
N valid	922	885	906	951	935
Missing	54	91	70	25	41
Mean	3.8616	3.8813	4.3566	4.0917	4.1144
Median	3.8824	3.9167	4,4737	4.2500	4.4286
Skewness	−0.443	−0.325	−0.298	−0.761	−0.961
Standard error skewness	0.81	0.82	0.81	0.79	0.80
Kurtosis	0.591	−0.057	2.389	0.035	0.126
Standard error kurtosis	0.161	0.164	0.162	0.158	0.160

Source: FEDER B-SEJ-516-UGR18.

TABLE 4 Correlations between dimensions.

Spearman rho		A Motivation	B Commitment	C Attitude and behavior	D Socio-economic conditions	E Continuity
A Motivation	correlation Coeff	1.000	0.563	0.412	0.157	0.272
	Sig. (bilateral)		0.000	0.000	0.000	0.000
	N	922	843	863	902	885
B Commitment	correlation Coeff	0.563	1.000	0.431	0.254	0.378
	Sig. (bilateral)	0.000		0.000	0.000	0.000
	N	843	885	840	875	862
C Attitude and behavior	correlation Coeff	0.412	0.431	1.000	0.352	0.373
	Sig. (bilateral)	0.000	0.000		0.000	0.000
	N	863	840	906	896	880
D Socio-economic conditions	correlation Coeff	0.157	0.254	0.352	1.000	0.342
	Sig. (bilateral)	0.000	0.000	0.000		0.000
	N	902	875	896	951	928
E Permanence	correlation Coeff	0.272	0.378	0.373	0.342	1.000
	Sig. (bilateral)	0.000	0.000	0.000	0.000	
	N	885	862	880	928	935

Source: FEDER B-SEJ-516-UGR18.

TABLE 5 Correlation coefficient Kruskall-Wallis.

	Null hypothesis	Test	Sig.
1	The distribution of Dimension A.-Motivation is the same across UNIVERSITY categories.	Kruskal-Wallis test for independent samples	0.007
2	The distribution of Dimension B.-Commitment is the same across UNIVERSITY categories.	Kruskal-Wallis test for independent samples	0.129
3	The distribution of Dimension C.-Attitude and behavior is the same across UNIVERSITY categories.	Kruskal-Wallis test for independent samples	0.627
4	The distribution of Dimension D.-Socio-economic conditions is the same across UNIVERSITY categories.	Kruskal-Wallis test for independent samples	0.225
5	The distribution of Dimension E.-Permanence is the same across UNIVERSITY categories.	Kruskal-Wallis test for independent samples	0.012

Source: FEDER B-SEJ-516-UGR18.

level is 0.05. Significance values have been adjusted by Bonferroni correction for several tests. Regarding the E.-Continuity dimension (Tables 8, 9), we again find that the behavior of UPO students is different from that of UGR and UJA students. The data show that UPO students have a lower tendency to continuity than students from the other two universities and, therefore, a higher risk of dropping out.

4.3 Risk estimation

To establish the at-risk group, we have decided to include those students who do not reach an average score of 3.00 in all their responses to the 71 items. With this cut-off score, we found that there are 34 students who do not reach the minimum value of 3.00. This

TABLE 6 Kruskal-Wallis statistics for independent samples dimension A.- Motivation/University.

Total N	919
Test statistic	16.056[a]
Degree of freedom	5
Asymptotic sig. (bilateral test)	0.007

Source: FEDER B-SEJ-516-UGR18.

represents 3.48% of the sample. Of these 34 students, 26 are women and 8 are men; 20 belong to the UGR, 8 to the UJA and 5 to the UPO. The average score achieved by the at-risk group is 2.21 for all their responses. The characteristics of the risk group are shown in Table 10.

TABLE 7 University-peer comparisons on dimension A.-Motivation.

Sample 1-Sample 2	Test statistic	Deviation error	Dev. test statistic	Significance	Adjusted significance[a]
UPO-UGR	108,894	34,435	3.162	0.002	0.023
UPO-UJA	144,439	36,879	3.917	0.000	0.001
UGR-UJA	−35,545	20,355	−1.746	0.081	1.000

Source: FEDER B-SEJ-516-UGR18.

TABLE 8 Kruskal-Wallis statistics for independent samples dimension E.- Permanence/pairs University.

Total N	932
Test statistic	14,613[a]
Degree of freedom	5
Asymptotic significance (bilateral test)	0.012

Source: FEDER B-SEJ-516-UGR18.

TABLE 9 University peer comparisons in dimension E.-Continuity.

Sample 1-Sample 2	Test statistic	Deviation error	Dev. test statistic	Significance	Adjusted significance[a]
UPO-UJA	100,942	37,370	2.701	0.007	0.104
UPO-UGR	116,017	35,063	3.309	0.001	0.014
UJA-UGR	15,076	20,275	0.744	0.457	1.000

Source: FEDER B-SEJ-516-UGR18.

TABLE 10 Characteristics of the risk group.

	N	Percentage
Risk group	34	3.48%
Gender	26 female	76.47%
	8 males	23.52%
University	20 UGR	58.82%
	8 UJA	23.52%
	5 UPO	14.70%
Average score achieved	2.21	

Source: FEDER B-SEJ-516-UGR18.

TABLE 11 Comparison between the characteristics of the at-risk group and the general sample.

	Total sample		Risk group	
Mean	3.83		2.21	
Subjects	976	100%	34	3.48%
Women	755	73.35%		76.47%
Men	215	22.02%		23.52%
UGR	642	65.77%		58.82%
UJA	260	26.63%		23.52%
UPO	73	7.47%		14.70%

Source: FEDER B-SEJ-516-UGR18.

Table 11 shows a comparison between the characteristics of the total sample and the characteristics of the risk group, on which we can make the following comments:

1 As already mentioned the overall mean of the risk group drops to 2.21 from the 3.48 points it reaches in the total sample.
2 In the risk group women are overrepresented by 3.12%,

TABLE 12 Items with the highest scores for the at-risk group.

No	Item	Dimension	Mean
9	I want to graduate.	A.- Motivation	4.11
11	To be a good professional is a personal goal.	A.- Motivation	3.88
12	I want to practice my profession when I finish my studies.	A.- Motivation	3.82
10	Completing my studies on time is important to me.	A.- Motivation	3.55
8	I am interested in obtaining an outstanding grade in my subjects.	A.- Motivation	3.44
18	I can complete the tasks I am given in my different subjects.	B.- Commitment	3.41
14	I consider myself an intelligent and capable person.	A.- Motivation	3.23
17	I see myself as a person with the necessary skills to succeed professionally.	A.- Motivation	3.20
13	I see myself as a successful professional.	A.- Motivation	3.05
20	I give priority to fulfilling my obligations as a student.	B.- Commitment	3.02
27	I have to spend time every day studying or doing academic work.	B.- Commitment	3.00

Source: FEDER B-SEJ-516-UGR18.

3 Men, on the other hand, are underrepresented by 1.5%.

4 The students of the University of Granada are underrepresented in the risk group by 6.95%.

5 Students from the University of Jaén are also underrepresented in the risk group by 3.11%. 5.

6 Students at the Pablo de Olavide University in Seville are overrepresented in the risk group by almost twice as much as the sample, from 7.47 to 14.70%, i.e., 7.23% more.

That is, the at-risk group has an overrepresentation of female UPO students.

In Table 12 we present the items with the highest scores for at-risk students, i.e., the items that are persistence-oriented since they score above 3.00. These are 11 out of the total of 71 items that make up the survey. This means that, in 60 items, at-risk students score below the mean of 3.00. Interestingly, the items with the highest scores for the at-risk group belong to dimensions A.-Motivation and B.-Commitment.

Table 13 shows the items with the lowest scores for at-risk students, and which should guide the corrective measures to be proposed. There are 28 items corresponding to all dimensions except the first one: motivation.

5 Discussion and conclusion

Our diagnosis of dropout risk focused on dimensions that have been frequently analyzed in the literature. Motivation to study, both external (for rewards) and internal (student autonomy) has been studied by Barroso et al. (2022) and by Aina et al. (2022) in their cost–benefit analysis of the effort made in the study. In our study we have found that motivation maintains a close relationship with permanence. The Commitment dimension already appears in the model of Spady (1970), Tinto (1975), Pascarella (1980), Cabrera et al. (1993), and Kehm et al. (2019). In all of them it is related to permanence in the same line as evidenced by our results. Positively correlated with permanence, although to a lesser degree, is our dimension Socioeconomic conditions. This same dimension has been addressed in the studies of Heublein et al. (2003), Kehm et al. (2019), and Barroso et al. (2022) as a predictor variable of academic dropout. Our

Attitude and Behavior dimension refers to the individual psychological coping variables of the study that are included in most of the models analyzed, such as Astin (1975) or Cabrera et al. (1993).

Same as what has happened to us, Velázquez and González (2017) found that there are significant correlations between the five dimensions that make up the instrument. In their case, the strongest correlation is established between E/A (Continuity and Motivation) followed by the pairs: E/B (Continuity and Commitment); E/D (Continuity and Socioeconomic Conditions) and E/C (Permanence and Attitude and Behavior). The latter with a very low correlation. They preferentially study the pairs integrated with the E/Continuity dimension.

In our case, we have studied all the pairs and have observed that A/B (Motivation and Commitment) and A/C (Motivation and Attitude and behavior) are the most strongly related pairs.

In any case, we agree with Velázquez and González (2017) that the strongest correlation is between the A/B (Motivation and Commitment) dimensions. In their Mexican application, dimensions A.-Motivation and D.-Socioeconomic conditions are strongly correlated and, in our case, the correlation is very low.

With their research, Velázquez and González (2017) wanted to identify risk factors around those items that obtained a lower standardized weight and that are grouped in the categories: internal motivation, personal commitment to study and socioeconomic conditions. This does not coincide with studies such as Pintrich (2004) and Solberg Nes et al. (2009) that point to the important effect of motivation and self-reported learning as retention factors in studies. Indeed, in our total sample, internal motivation scores very low. But there are no significant differences between the total sample and the at-risk group. Moreover, our results coincide with the findings of international and classical studies reported by Tinto (2022).

We have established criteria for diagnosing students at risk of dropping out. We choose a high sensitivity at the expense of a strong specificity. That is, in a first analysis we have opted for the risk group to include those students with a strong prediction of dropping out (high sensitivity), leaving out those students that had a moderate prediction but who will eventually drop out. The latter have not been included in our risk group (low specificity). The advantage of this decision, which has led us to set the cut-off point at 3.00, is that it does not alarm the authorities and allows us to test corrective measures

TABLE 13 Worst-scoring items by students at risk: below 2.00 (1.02−1.97).

No	Item	Dimension	Mean
64	The means of transport I use to travel to the faculty does not represent a problem for me to attend my classes on time.	D.-Socio-economic conditions	1.17
38	I feel that there is a commitment on the part of the academic authorities to attend to my needs as a student.	B.-Commitment	1.17
65	I have never interrupted my studies for one semester or more.	E.-Continuity	1.17
68	Currently I do not have any subjects pending from previous semesters.	E.-Continuity	1.23
41	I consider tutorial activities have had a positive impact on my academic performance.	B.-Commitment	1.32
66	I have never considered suspending my university studies temporarily or permanently.	E.-P Continuity	1.38
39	The library hours are in line with my academic schedule.	B.-Commitment	1.40
43	I have no family problems that affect my concentration or performance.	C.-Attitude and behavior	1.47
70	I have never failed one or more subjects for not reaching the compulsory attendance percentage.	E.-Continuity	1.50
48	I feel morally supported by my family members.	C.-Attitude and behavior	1.50
46	At home, household activities are shared by all members of the family.	C.-Attitude and behavior	1.50
36	The coordination of my undergraduate studies facilitates the execution of my academic activities.	B.-Commitment	1.50
35	The administrative procedures I have requested from the corresponding area have been solved satisfactorily.	B.-Commitment	1.50
37	The coordinator of my undergraduate studies takes action to ensure that there are no free hours between classes.	B.-Commitment	1.50
45	Communication with my family members is positive and open.	C.-Attitude and behavior	1.55
69	I am keeping up to date with my English language levels.	E.-Continuity	1.58
40	I have a tutor in my faculty.	B.-Commitment	1.61
44	The values of study and hard work are encouraged and practiced at home.	B.-Commitment	1.64
63	I do not need to work to pay for my university education.	D.-Socio-economic conditions	1.70
47	I identify my parents as authority figures.	C.-Attitude and Behavior	1.73
62	I have external financial support such as family income, funding, or scholarships for my studies.	D.-Socio-economic conditions	1.76
51	I feel proud of the studies I am taking.	C.-Attitude and behavior	1.82
49	I feel fully integrated in my group of fellow students at the university.	C.-Attitude and behavior	1.89
56	I feel accepted and valued by my classmates.	C.-Attitude and behavior	1.94
60	I consider myself a productive and socially accepted person.	C.-Attitude and behavior	1.94
61	At home I have adequate space, services, and equipment to carry out my university tasks.	D.-Socio-economic conditions	1.94
67	I have taken all my subjects as an on-campus student at the University.	E.-Continuity	1.94
42	My relationship with my family is friendly and respectful.	C.-Attitude and behavior	1.97

Source: FEDER B-SEJ-516-UGR18.

with those most in need knowing that they can later be extended to larger groups.

With adequate follow-up of the surveyed students and with future annual applications of the screening, we will be able to adjust the diagnostic criteria to a reasonable and efficient balance between sensitivity and specificity values in line with the work of Ávalos Ruiz and Fernández Cruz (2022), varying, if necessary, the cut-off point. With our decision, the risk group has a size of 3.48% when the contrasted data offer real dropout data of 13% in Spain (Ministry of Universities of the Government of Spain, 2022). The high sensitivity is far from the real size, so it is our intention to increase the specificity with periodic screening applications.

As pointed out by Aina et al. (2022) and as we have reviewed in our study, university dropout is the result of a sequential process carried out under gradually decreasing levels of uncertainty and students' awareness of the costs of education and future returns, as well as the level of integration of that student into their academic system.

In short, university dropout is a multivariate phenomenon in which the final decision is mediated by different determinants. The application of screening has made it possible to establish a baseline on the risk factors for dropout in Higher Education in Andalusian universities. Both Ambiel (2015) and Ortigosa et al. (2019) are examples of good practice in establishing dropout risk groups by

assessing predictive dimensions such as those we have donated. Ortigosa et al's (2019) own work, as previously done by Lin and Tang (2015), uses data mining and learning analytics along with assessment scales to perform the diagnosis. We have limited ourselves to the application of screening. We left the use of data mining for later. We have established the response profile of the student body by gender, degree studies and university of origin. We have established which are the items best rated by the students, which become protective factors, which are the items worst rated by the students and which become risk factors. In addition, we have established the level of correlation between the dimensions that make up the instrument. This constitutes the baseline of the risk of academic failure and dropout in Andalusia.

This is the line followed by those scholars who call for joining academic and scientific efforts to offer predictive strategies and solutions (Gairín et al., 2015). Preventive measures should consider preventing dropout, for example, increasing institutional resources and/or creating interventions to improve academic and social integration, motivation, study skills and study effort.

At the same time, the preventive or corrective measures to be applied in the at-risk population will focus on reversing the orientation of those same factors that, as we have already seen, generate persistence. The descriptive analyses that have been carried out on dropout prevention models reveal that the situation can be alleviated. Different programs and extraordinary measures of attention are being experimented in Higher Education Institutions around the world. These are intended to increase the persistence of students in their studies and minimize the negative effects for the institutions and for the public administrations themselves. To this end, the unproductive expenditure that would be generated by potential dropouts must be transformed into investment that generates productive returns and economic growth, i.e., that applies productive expenditure for graduate students (Tinto, 2022). In short, it is a matter of adjusting university educational policies and their curricular and organizational practices and including palliative, remedial and preventive actions to alleviate the situation (Olmos, 2021).

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

Author contributions

MFC: Investigation, Supervision, Validation, Writing – review & editing. DÁ: Data curation, Formal analysis, Software, Writing – original draft. FBF: Data curation, Software, Validation, Writing – original draft. EG: Methodology, Resources, Writing – original draft.

Funding

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.

The reviewer SL declared a shared affiliation with the authors to the handling editor at time of review.

Publisher's note

References

Aina, C., Baici, E., Casalone, G., and Pastore, F. (2022). The determinants of university dropout: a review of the socio-economic literature. *Soc. Econ. Plan. Sci.* 79:101102. doi: 10.1016/j.seps.2021.101102

Aljohani, O. (2016). A comprehensive review of the major studies and theoretical models of student retention in higher education. *High. Educ. Stud.* 6, 1–18. doi: 10.5539/hes.v6n2p1

Álvarez, D., Arias, M., González, E., and Fernández Cruz, M. (2022). Neurodidactics factos in the prediction of academic dropout in Andalusian university students: preventive actions based on ICT. *Texto Livre* 15, 1–12. doi: 10.35669/1983-3652.2022.40502

Ambiel, R. A. M. (2015). Construção da escala de motivos para evasão do ensino superior. *Avaliação Psicológica* 14, 41–52. doi: 10.15689/ap.2015.1401.05

Argentin, G., and Triventi, M. (2011). Social inequality in higher education and labour market in a period of institutional reforms: Italy 1992–2007. *High. Educ.* 61, 309–323. doi: 10.1007/s10734-010-9379-6

Astin, A. W. (1975). *Preventing students from dropping out*. San Francisco: Jossey-Bass.

Ávalos Ruiz, I., and Fernández Cruz, M. (2022). Validación de un instrumento de cribado para la detección de alumnado en riesgo de exclusión social. *Educar* 58, 481–499. doi: 10.5565/rev/educar.1519

Bakker, E. J., Kox, J. H., Boot, C. R., Francke, A. L., van der Beek, A. J., and Roelofs, P. D. (2020). Improving mental health of student and novice nurses to prevent dropout: a systematic review. *J. Adv. Nurs.* 76, 2494–2509. doi: 10.1111/jan.14453

Barroso, P. C. F., Oliveira, Í. M., Noronha-Sousa, D., Noronha, A., Mateus, C. C., Vázquez-Justo, E., et al. (2022). Dropout factors in higher education: a literature review. *Psicologia Escolar e Educacional* 26:e228736. doi: 10.1590/2175-35392022228736t

Bean, J. P. (1980). Dropouts and turnover: the synthesis and test of a causal model of student attrition. *Res. High. Educ.* 12, 155–187. doi: 10.1007/BF00976194

Bean, J., and Metzner, B. (1985). A conceptual model of non-traditional undergraduate student attrition. *Rev. Educ. Res.* 55, 485–540. doi: 10.3102/00346543055004485

Boyraz, G., Horne, S. G., Owens, A. C., and Armstrong, A. P. (2013). Academic achievement and college persistence of African American students with trauma exposure. *J. Couns. Psychol.* 60, 582–592. doi: 10.1037/a0033672

Cabrera, A., Nora, A., and Castaneda, M. (1993). College persistence: structural equations modeling test of an integrated model of student retention. *J. High. Educ.* 64, 123–139. doi: 10.2307/2960026

Casanova, J. R., Assis, C. M., Bernardo, A. B., Núñez, J. C., and Almeida, L. S. (2021). Dimensionality and reliability of a screening instrument for students at-risk of dropping out from higher education. *Stud. Educ. Eval.* 68:100957. doi: 10.1016/j. stueduc.2020.100957

Colás Bravo, P. (2015). Strategies of action: improving employability. *Revista Fuentes* 16, 9–14. doi: 10.12795/revistafuentes.2015.i16

de Oliveira, C. F., Sobral, S. R., Ferreira, M. J., and Moreira, F. (2021). How does learning analytics contribute to prevent students' dropout in higher education: a systematic literature review. *Big Data Cogn. Comput.* 5:64. doi: 10.3390/ bdcc5040064

Eurostat (2020). Tertiary education statistics. Available at: https://ec.europa.eu/ eurostat/statistics-explained/index.php?title=Tertiary_education_statistics

Gairín, J., Rodríguez, D., Navarro, M., Muñoz, J. L., and Feixas, M. (2015). Hacia la comprensión del abandono universitario en Catalunya: el caso de la Universitat Autónoma de Barcelona. *Estudios Sobre Educación* 28, 117–138. doi: 10.15581/004.28.117-138

Heublein, U., Spangenberg, H., and Sommer, D. (2003). *Ursachen des Studienabbruchs: Analyse 2002* Hannover: HIS.

Kehm, B. M., Larsen, M. R., and Sommersel, H. B. (2019). Student dropout from universities in Europe: a review of empirical literature. *Hungarian Educ. Res. J.* 9, 147–164. doi: 10.1556/063.9.2019.1.18

Lin, Y. P., and Tang, K. T. (2015). An inductive power and data telemetry subsystem with fast transient low dropout regulator for biomedical implants. *IEEE Trans. Biomed. Circ. Syst.* 10, 435–444. doi: 10.1109/TBCAS.2015.2447526

López-Cózar, C., Benito, S., and Priede, T. (2020). Un análisis exploratorio de los factores que inciden en el abandono universitario en titulaciones de ingeniería. *Rev. Docencia Universitaria* 18, 81–96. doi: 10.4995/redu.2020.13294

Martínez-López, Z., Gázquez-Linares, J. J., Sainz-de-Abajo, B., and Cejudo-Macías, R. (2023). Predictive models for identifying at-risk students in higher education using data mining techniques. *Appl. Sci.* 13:1336. doi: 10.3390/app13031336

Ministry of Universities of the Government of Spain (2022). *Estudio sobre el Abandono de los Estudios de Grado en el Sistema Universitario Español.*

Moreno-Candil, D., Garzón-Umerenkova, A., and Vera-Baceta, M. A. (2022). Early warning and monitoring systems to reduce dropouts at universities: tools for educational guidance. *MDPI Proc.* 88:9. doi: 10.3390/proceedings2022088009

Moreno-Guerrero, A. J., López-Belmonte, J., and Hinojo-Lucena, M. Á. (2022). Dropout prevention in higher education through socio-emotional mentoring. *Int. J. Environ. Res. Public Health* 19:10285. doi: 10.3390/ijerph191610285

OECD (2019), *Education at a glance 2019: OECD indicators.* OECD Publishing, Paris.

Olmos, E. (2021). Análisis de los factores relacionados con la deserción escolar en el Instituto Tecnológico de Tlalpan. *TecNM*, 2015–2019. Universidad Autónoma de Morelos (Mex), Magister Disertation.

Ortigosa, A., Carro, R. M., Bravo-Agapito, J., Lizcano, D., Alcolea, J. J., and Blanco, O. (2019). From lab to production: lessons learnt and real-life challenges of an early student-dropout prevention system. *IEEE Trans. Learn. Technol.* 12, 264–277. doi: 10.1109/TLT.2019.2911608

Pascarella, E. T. (1980). Student-faculty informal contact and college outcomes. *Rev. Educ. Res.* 50, 545–595. doi: 10.3102/00346543050004545

Pintrich, P. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educ. Psychol. Rev.* 16, 385–407. doi: 10.1007/ s10648-004-0006-x

Rumberger, R. W. (2020). The economics of high school dropouts. *Econ. Educ.* (2ª Ed), (Academic Press), 149–158.

Samuel, R., and Burger, K. (2020). Negative life events, self-efficacy, and social support: risk and protective factors for school dropout intentions and dropout. *J. Educ. Psychol.* 112, 973–986. doi: 10.1037/edu0000406

Solberg Nes, L., Evans, D. R., and Segerstrom, S. C. (2009). Optimism and college retention: mediation by motivation, performance, and adjustment. *J. Appl. Soc. Psychol.* 39, 1887–1912. doi: 10.1111/j.1559-1816.2009.00508.x

Spady, W. (1970). Dropouts from higher education: an interdisciplinary review and synthesis. *Interchange* 1, 64–85. doi: 10.1007/BF02214313

Tinto, V. (1975). Dropout from higher education: a theoretical synthesis of recent research. *Rev. Educ. Res.* 45, 89–125. doi: 10.3102/00346543045001089

Tinto, V. (2022). "Exploring the character of student persistence in higher education: the impact of perception, motivation, and engagement" in *Handbook of research on student engagement.* eds. A. L. Reschly and S. L. Christenson (Cham: Springer), 357–379.

Velázquez, Y., and González, M. (2017). Factores asociados a la permanencia de estudiantes universitarios: caso UAMM-UAT. *Revista de la Educación Superior* 46, 117–138. doi: 10.1016/j.resu.2017.11.003

Frontiers in Education

Explores education and its importance for individuals and society

A multidisciplinary journal that explores research-based approaches to education for human development. It focuses on the global challenges and opportunities education faces, ultimately aiming to improve educational outcomes.

Discover the latest Research Topics

See more →

Frontiers in Education

frontiers | Research Topics