Analysis of university dropout in Spain: a bibliometric study

Análisis del abandono universitario en España: un estudio bibliométrico

西班牙大学辍学分析：文献计量研究

Анализ отсева из университетов в Испании: библиометрическое исследование

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Abstract

Introduction: one of the main problems that the university system always faces, is the university dropout rates of its students, due to various variables. This is not only a problem of the Spanish university, but is widespread throughout the world, so it is necessary to know and analyse the reasons that lead to this fact in order to be able to alleviate this university dropout.

Method: a quantitative-bibliometric methodology was used to explore the Web of Science and retrieve 182 scientific articles in the area of educational research for the study sample during the period from 2002 to 2021. The information sources, authors and keywords of the articles were taken as variables to carry out the relevant analyses with the RStudio and VOSviewer programmes.

Results: the main journals in which the articles are published are identified, as well as the most prolific authors in the topic of university dropout. A factorial approach is carried out with the key words of the articles where we identify the main topics and problems that can lead to university students dropping out of their studies, such as certain educational policies, the rise of distance education, academic failure in basic educational stages or social, personal, psychological or economic variables.

Conclusions: four main components are behind university dropout: academic failure, learning methodologies, impact and dropout. From these, specific problems to be taken into account and be the object of study and analysis, such as, among others, certain educational policies, the new virtual environments, school failure in the basic stages or various academic and personal variables.

Keywords: Dropout, higher education, students, Spain, bibliometrics.

Resumen

Introducción: uno de los principales problemas a los que siempre se enfrenta el sistema universitario es a los índices de abandono universitario de sus estudiantes a causa de diversas variables. No solo se trata de un problema de la universidad española, sino que se extiende por todo el mundo por lo que requiere conocer y analizar los motivos que llevan a este hecho con el objeto de poder paliar esta deserción universitaria.

Método: se emplea una metodología cuantitativa-bibliométrica con la que se ha explorado la Web of Science y recuperado para la muestra del estudio 182 artículos científicos del área de la investigación educativa durante el periodo entre 2002 y 2021. Se toman como variables las fuentes de información, autores y palabras clave de los artículos para realizar los análisis pertinentes con los programas RStudio y VOSviewer.

Resultados: se identifican las principales revistas de publicación de los artículos, así como los autores más prolíficos en el tópico del abandono universitario. Se realiza una aproximación factorial con las palabras clave de los artículos en donde identificamos los principales tópicos y problemáticas que pueden propiciar el abandono de sus estudios en los universitarios como determinadas políticas educativas, el auge de la educación a distancia, el fracaso académico en etapas educativas básicas o variables de tipo social, personal, psicológicas o económicas.

Conclusiones: cuatro grandes componentes principales estarían detrás de la deserción universitaria: fracaso académico, metodologías de aprendiza, impacto y abandono. A partir de ellos, problemáticas específicas a tener en cuenta y ser objeto de estudio y análisis como pueden ser, entre otras, determinadas políticas educativas, los nuevos entornos virtuales, el fracaso escolar en las etapas básicas o diversas variables académicas y personales.

Palabras clave: Abandono, educación superior, estudiantes, España, bibliometría.

摘要

引言：大学系统一直面临的主要问题之一是由于不同变量导致其学生辍学的大学辍学率。这不仅是西班牙大学的问题，而且在世界范围内普遍存在，因此有必要了解和分析导致这一事实的原因，以便能够缓解大学辍学的问题。

方法：采用定量-文献计量学方法对Web of Science进行检索，检索2002年至2021年期间教育研究领域的182篇科学文章作为研究样本。获取文章的信息来源、作者和关键词作为变量使用 RStudio 和 VOSviewer 程序进行相关分析。

结果：研究确定了发表相关文章的主要期刊，以及研究大学辍学主题的主要作者。我们还对文章的关键词进行因子分析，找出可能导致大学生辍学的主要话题和问题，例如某些教育政策、远程教育的兴起、基础教育阶段学业的失败、社会、个人、心理或经济变量。

结论：大学辍学背后有四个主要因素：学业失败、学习方法、影响和辍学。从这几点出发，应该考虑将一些具体问题列入研究和分析的对象，例如某些教育政策、新的虚拟环境、基础阶段的学业失败或各种学术和个人变量。

关键词：辍学、高等教育、学生、西班牙、文献计量学。

Аннотация

Введение: одной из основных проблем, с которой всегда сталкивается университетская система, является отсев студентов в силу различных причин. Это проблема не только испанского университета, она широко распространена во всем мире, поэтому необходимо знать и проанализировать причины, которые привели к этому факту, чтобы снизить уровень отсева студентов.

Метод: была использована количественно-библиометрическая методология для изучения Web of Science и извлечения 182 научных статей в области образовательных исследований для исследуемой выборки за период между 2002 и 2021 гг. Источники информации, авторы и ключевые слова статей были взяты в качестве переменных для проведения соответствующих анализов с помощью программ RStudio и VOSviewer.

Результаты: были определены основные журналы, в которых были опубликованы статьи, а также наиболее плодотворные авторы по теме отсева из университетов. Факторный подход осуществляется с помощью ключевых слов статей, в которых мы определяем основные темы и проблемы, которые могут привести к отчислению студентов из университета, такие как определенная образовательная политика, рост дистанционного образования, академическая неуспеваемость на основных этапах обучения или социальные, личностные, психологические или экономические переменные.

Выводы: существует четыре основных компонента отсева из университетов: академическая неуспеваемость, методология обучения, влиятельность и отсев. Из них следует, что конкретные проблемы должны быть приняты во внимание и стать объектом изучения и анализа, такие как, среди прочего, определенная образовательная политика, новая виртуальная среда, академическая неуспеваемость на основных этапах или различные академические и личностные переменные.

Ключевые слова: Отсев, высшее образование, студенты, Испания, библиометрия.

Background and theoretical framework

Since its inception, the university system has had to tackle an issue of huge social and economic dimensions. This longstanding challenge is that known as university dropout.

University dropout provokes deep personal disappointment, demotivation and low self-esteem in individuals, alongside many other emotions. Given these personal ramifications, psychologists consider it to be an important topic of study (Hernández López & Polo Muñoz, 1999; Lorenzo Quiles, 2021). Further, applying a psychological lens, academic failure has been studied from different perspectives, with descriptive research mainly emerging.

Unfortunately, this issue is widespread throughout the world. The International Institute for Higher Education in Latin America and the Caribbean (IESALC) state that 43% of young students managed to achieve higher degrees in 2006. Other countries, such as the Dominican Republic, Uruguay and Bolivia reported higher rates, up to 70%, with their dropout rate being 44.5% (Urbina Cárdenas & Ovalles Rodríguez, 2016). With regards to Europe, a similar situation is found and, indeed, this phenomenon was detected earlier in other parts of Europe than in Spain. Austria is one of the countries with the highest rates of dropout, reaching heights of 45% (Cabrera et al., 2006).

Turning attention to Spain, the last study conducted by the National Statistics Institute (INE) stated that "in 2020, early dropout from education-training in Spain reached a figure of 20.2% in males and 11.6% in females. Early dropout from education-training has always been higher in males. This figure has started to drop in recent years, with values of 21.8% reported amongst males in 2017, 21.7% in 2018 and 21.4% in 2019. In females, dropout reached a rate of 14.5% in 2017, 14.0% in 2018 and 13.0% in 2019". Further, Millán in their news article published on the 27th of June 2021, reported that 16% of individuals aged between 18 and 24 years, do not end up finishing compulsory secondary education, with this dropout rate only being exceeded by Malta with a figure of 16.7%. This leaves Spain as the UE country with the second highest rate of school dropout. With regards to the university setting, there is a 30% university dropout rate at Spanish universities, relative to the 16% found to exist in the other 15 European countries (Cabrera et al., 2006)

In light of this information, it can be stated that dropout from the educational system is pertinent to all levels from mandatory secondary education to higher education. For this reason, it is necessary to be attentive to training competent professionals who are committed to eradicating dropout from the Spanish educational system.

At the time of writing, a literature review is required with the principal aim of identifying the appropriate approach to tackle this challenge and provide incoming students with solutions so that they decide to continue with their university studies. The present study analyses the first research studies conducted on the topic. Considered studies took an individual approach to this specific issue, focused on specific groups of individuals and totally discarded the direct or indirect influence of external factors. One of these studies was conducted by Tinto (1975), whose conceptual basis was taken from Durkheim's (1897) suicide theory and whose view of this phenomenon was purely economic (Vásquez Velázquez et al., 2013). Upon entering the 21st century, research on this topic started to increase from 2005 onwards (Álvarez Pérez & López-Aguilar, 2017). In these more recent research studies, such as in that conducted by González-Ramírez and Pedraza Navarro (2017, p. 367) three main lines of research were indicated:

1. Quantification of the phenomenon

2. Construction of explanatory models of dropout

3. Identification of factors associated with dropout

Models of dropout from higher education and lines of research in the field

It is necessary to delve deeper into the different explanations provided to uncover the reasons behind which university students end up dropping out of higher education. These ways of thinking are known as models and are organised into four different models:

1. Model of adaptation: This way of thinking corresponds to all individuals who end up dropping out of degree studies due to their inability to adapt to university life.

2. Economic model: Here, any young person is found whose time, energy and financial investment does not reap the rewards they hope to obtain. This perspective rests on the human capital theory.

3. Psycho-pedagogical model: Studies approaching university dropout from this perspective attribute academic failure to certain psychological characteristics inherent to the individual. Some of these characteristics include the inability to take on challenges, ignorance of learning strategies, difficulty in achieving goals... amongst others.

4. Structural model: This model outlines that university dropout is the culmination of all of the contradictions inherent to the different systems (political, economic and social) that act directly on the individual in a meaningful way. This model characterises university dropout as a behaviour inherent in individuals, making it extremely complicated to establish specific reasons behind why students walk away from the higher education setting (Cabrera et al., 2006).

Likewise, research studies published on this issue can be classified according to different lines of research depending on the variables under examination. González-Ramírez and Pedraza-Navarro (2017) define three lines of research to which all university dropout studies can be grouped.

1. Personal reasons. Dropout in individuals aged around 18 years old is founded mainly on lack of knowledge and lack of information, with this being influenced by the score obtained in entrance exams to access university (PAU). Another factor to consider pertains to that stated by Elías (2008) that dropout from degree studies is often due to the studied degree not being the students first choice prior to enrolment. Further, the complicated way in which this ambit is accessed must also be considered (González-Ramírez & Pedraza-Navarro, 2017). Finally, other personal reasons to consider emerge with regards to negative thinking and the lack of coping strategies with which to tackle the challenges faced by students (Cabrea et al., 2006a; Bethencourt et al., 2008).

2. The relationship between personal and interpersonal variables. The main causes of this are as follows:

   a. Aspects related with university management.

b. Teaching factor. The lack or excess of demands made by teachers, their approach to delivering teaching, the type of exams set... etc.

c. Intra-individual reasons and relationships between peers. Upon starting university, the individual is ignorant of study approaches, lack of responsibility, unpleasant working classroom climates, aggressive competition... amongst others (Tejedor & García-Varcárcel, 2007).

3. The third and final line of research examines the relationships between psycho-educational and socio-political variables. In other words, explanations such as age are provided for dropout, in addition to family size (whether or not the student comes from a large family), socioeconomic status (coming from a low or high socioeconomic background) and a hostile working classroom climate (Casquero Tomás & Navarro, 2010; García de Fanelli & Adrogué de Deane, 2015; González-Ramírez & Pedraza-Navarro, 2017) are found.

Approaches to student retention

Velázquez Narváez and González Medina (2017), in contrast to other previously conducted studies, examined the motives and reasons behind which young people opted to stay at university and continue their degree studies. Relevant models can be considered from different standpoints:

- Psychological. This standpoint considers the specific physical and psychological features of individuals.

- Sociological. This standpoint examines in depth the extent of the impact of external factors on the individuals under examination.

- Organisational and participatory. In these models, individuals evaluate the type of engagement and organisation present, whether positive or negative and at the institutional and peer group level.

At the same time, Velázquez Narváez and González Medina (2017) highlight two research theories:

1. Economic. In this theory, a relationship is established between socioeconomic level and social integration.

2. Degree choice. This theory argues that when individuals choose their degree studies in a considered, mature and informed way, the likelihood of them finishing them will be high.

Impact of dropout/Rates of change and dropout

When a student, regardless of the degree study being undertaken, decides to dropout from their studies, there is a resounding impact, not only in the economic ambit but, also, in a social sense. Every year, the Ministry of Education, Culture and Sport publishes a report entitled "Data and Figures pertaining to the Spanish University System", in which the present university dropout rates for all Spanish universities. Specifically, in 2014, this report informed that one in every five first-year university students abandoned their university studies (Colás, 2015).

The Ministry of Education, Culture and Sport (2020) reported that 33.9% of young people who enrolled at a Spanish university during the 2013/14 academic year, abandoned the degrees they had embarked on, whilst 12.3% changed to a different course. Likewise, the report differentiated between in-person and online courses, highlighting that the latter had higher dropout rates. With regards to the 2015/16 academic year, the dropout rate dropped to 21.7%, nonetheless, the proportion of those opting to change courses increased to 18.7% in women and to 25.1% in the case of men.

Turning to look back further beyond 2014, it can be seen that in 2009, dropout rates were climbing to 30% from higher education amongst first-year students. In 2014, this rate was 19%, with this being 3% higher than the average reported in Europe (16%) and leading to an economic cost of 1,500 million euros (Colás, 2015).

With regards to the current academic year (2020), the National Statistics Institute stated in their report entitled "Early Dropout from Education-Training in those Aged between 18 and 24 Years in the UE", that dropout rates continued to decline. Further, dropout was lower amongst women (11.6%) than men (20.2%), producing an overall average of 15.9% university dropout in Spain.

Colás (2015) points to other highly concerning figures pertaining to university dropout, alleging that 66% of university students fail to finish their studies, only 39% extend their studies and 28% plan on abandoning higher education. All of this proposes a cost to the Spanish government of 8235 million euros.

Proposals addressing dropout

Remedial training is not only designed to improve academic skills. By its very nature, it must integrate guidance services, advice, tutorials, workshops... etc., making it well-positioned to help all students and not only those with skill shortcomings at the time of embarking upon higher education (Bahr, 2007, 2008a, 2008b).

Overarching programs exist to prevent dropout, however, programs delivered by the European Community will form the basis of the following discussion. One example comes from a proposal framed within the European Framework for Preparatory Courses for the University Transition. This framework comprises various programs, of which the "Lifelong Learning Program" stands out. This program provides a database of 118 courses from the year 2009 onwards, providing an insight into remedial training provision on offer in Europe. Turning attention to Spain, all universities have in place different tutorial action plans (PAT) as remedial approaches against university dropout. These plans orient students with regards to the availability and use of learning resources, and academic and professional guidelines. An example of a PAT in action, comes from that in place at the Leon University since 2002. This plan outlines processes around intake, information and guidance targeted towards newly enrolled university students, in this way, facilitating their complete incorporation into university life (Medialdea, 2014)

Medialdea, in their doctoral thesis published in 2014, highlighted 'Course Zero' as an example of an effective preventive teaching course against dropout delivered during the first year of university studies. This course is delivered by the University of Granada, Carlos III University in Madrid, Alcala University etc. Other courses outlined by this same researcher include social skills, self-esteem and anxiety management courses, amongst others, delivered by the University of Burgos, Pablo de Olavide University and the University of Granada, amongst others.

Research aims

Three main research aims were proposed for the present study in line with the different sources of knowledge available in the literature: Information sources, authors and keywords. The following aims were defined:

1. Identify the most frequently selected academic journals by authors to publish their scientific work on the topic of university dropout in Spain.

2. Identify the most prolific authors on the topic of university dropout over the last 20 years (2002-2021).

3. Distinguish the main themes and issues addressed by existing educational research on university dropout in Spain.

Method

Employing a quantitative-bibliometric methodology, 182 scientific documents were retrieved from the core collection of the *Web of Science* (WoS) database. Documents came, specifically, from the thematic category pertaining to the field of *Education & Educational Research.*

The search process was initiated by refining the "topic" and employing the search terms of "*dropout*" and "*higher education*". To this end, the Boolean operator "AND" was used between both rows in the search box. Next, the time-frame was set to only include articles from the last 20 years, in other words, those published between 2002 and 2021. Finally, filters pertaining to the region or country of publication were set to include only documents from Spain, whilst the search was set to include all source types. This resulted in four different types of document being uncovered: 129 scientific articles, 48 acts of congress, 3 reviews and 2 book chapters.

For data analysis, information around information sources (journals), authors and keywords retrieved from the scientific documents provided the study variables. With regards to the latter, both *author's keywords* and *keywords plus* were used. To this end, the Biblioshiny interface available in RStudio v.4.0.4 (Aria & Cuccurullo, 2017) and VOSviewer v.1.6.16 (Van Eck & Waltman, 2010) were used for the construction and visualisation of thematic maps and graphs.

Results

Firstly, an effort was made to identify the journals that published the greatest number of scientific articles from the present sample. For this, examination was based on Bradford's Law of scattering or the distribution of scientific literature (Tortosa & Civera, 2002). This law strives to explain why an unequal distribution exists in the production of articles in scientific journals, with a small percentage of articles being distributed between a large number of journals, whilst the majority of articles are concentrated within a small number of journals (Urbizagástegui Alvarado, 1996). This distribution tends to be represented graphically via so-called Bradford zones and can be seen in Figure 1 provided below:

Figure 1

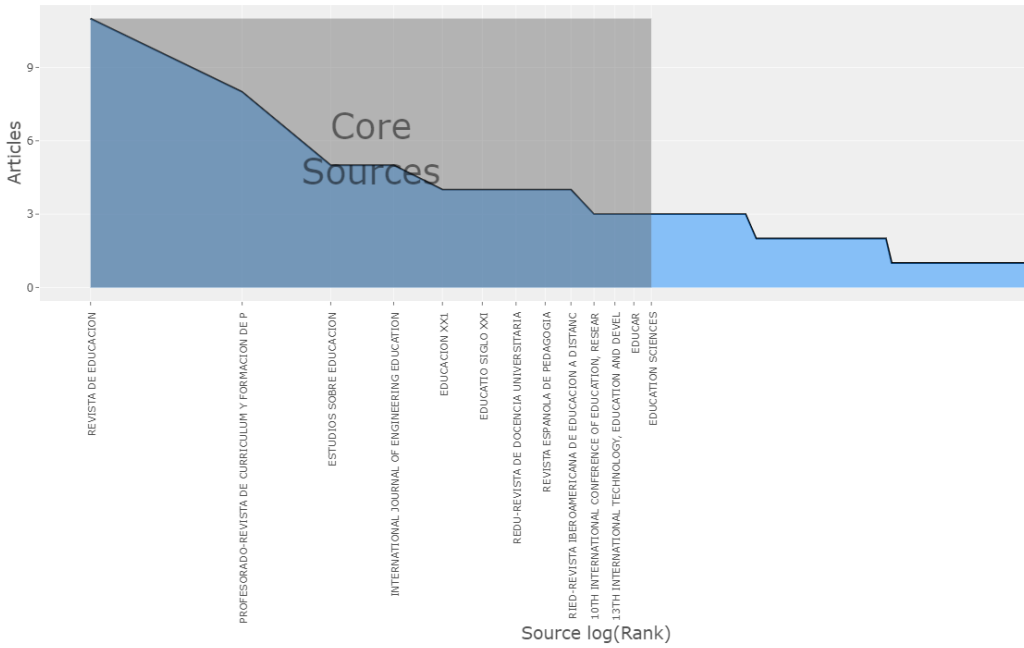*Bradford's Law of scattering showing the dispersion of examined articles between the main journals*

Table 1

Sources found in Bradford's zone 1 and total citations

Journals (sources)	Ranking	Frequency	Accumulated frequency	Total citations	Zone
Revista de Educación	1	11	11	106	1
Profesorado-Revista de Curriculum y Formación de Profesorado	2	8	19	14	1
Estudios sobre Educación	3	5	24	8	1
International Journal of Engineering Education	4	5	29	22	1
Educación XX1	5	4	33	13	1
Educatio Siglo XXI	6	4	37	9	1
REDU-Revista de Docencia Universitaria	7	4	41	21	1
Revista Española de Pedagogía	8	4	45	9	1

Journals (sources)	Ranking	Frequency	Accumulated frequency	Total citations	Zone
RIED-Revista Iberoamericana de Educación a Distancia	9	4	49	44	1
10th International Conference of Education, Research and Innovation (ICERI2017)	10	3	52	1	1
13th International Technology, Education and Development Conference (INTED2019)	11	3	55	0	1
Educar	12	3	58	8	1
Education Sciences	13	3	61	3	1

As can be observed in Table 1 and Figure 1, a large number, specifically 61, of the scientific outputs included in the present sample were distributed between 13 different sources, with 11 of these being academic journals and 2 being found in the book of acts of international congresses. All of these information sources were found in Bradford's zone 1, from which it can be interpreted that these journals, during the time period studied, are the most popular when it comes to publishing scientific research in the field of university dropout. Almost certainly, this motivation comes from the historic specialisation of these publications on this topic. The publishing approach taken by these journals is likely important, whether due to them taking a general outlook to including any type of issue of interest in the scientific community with regards to education, or to them being more specific in their lines of research and focusing on inherent aspects of the topic such as higher education, the student body or university teaching. It is important to comment on the fact that, to arrive at the included sample of 182 scientific articles, 121 documents have yet to be discussed. These were distributed between 89 sources, including journals and book of acts of congresses, within the Bradford zones 2 and 3. In other words, in this case, only 1 or 2 documents were found to be published in each source, denoting a complete lack of special preference by authors when selecting a publication destination.

Another aspect to consider is the impact of the publications, in other words, the citations received by the works published in the aforementioned journals between 2002 and 2021. Given that this is a crucial indicator for any author or researcher as it denotes greater visibility and research implication, it is no coincidence that articles published by the journal named 'Revista de Educación', aside from being the highest ranked journal with 11 published articles pertaining to university dropout, received the most citations with 106. Whilst it is true that not all sources enjoy very high impact values, they were the most important sources of all of those gathered in the present study. The journal entitled 'RIED-Revista Iberoamericana de Educación a Distancia' also stands out with 44 citations pertaining to its 4 relevant published articles, alongside the journals the 'International Journal of Engineering Education' and 'REDU-Revista de Docencia Universitaria' with 22 and 21 citations, respectively. Without a doubt, the sci-

entific impact of a journal provides another motive for authors at the time of deciding where to send scientific work.

Having identified the most important sources in which to publish scientific work on university dropout in Spain, we proceeded to identify the most prolific authors in the field during the two decades corresponding to the study period. For this, author output over time was analysed, as shown in Figure 2.

Figure 2

Output of the most prominent authors over time
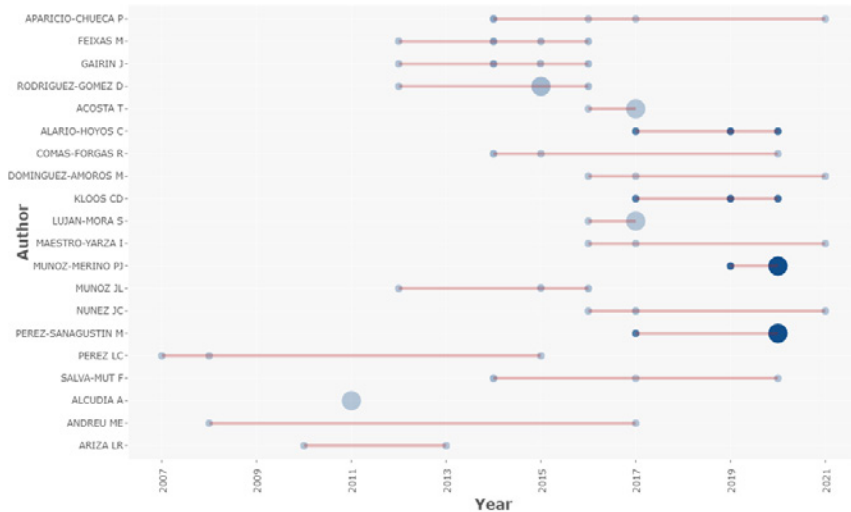
From the above figure, four main aspects can be highlighted:

1. No single author was identified to have produced 10 or more scientific articles on university dropout.

2. A total of 501 authors were responsible for the sample of 182 scientific articles and, in view of the data presented in Figure 2, the majority of authors foraged into the topic of university dropout in a sporadic way.

3. The authors Aparicio-Chueca P., Feixas M., Gairin J., and Rodríguez-Gómez D. are the most prolific, with four published articles each. In the case of Aparicio-Chueca P., their outputs expanded the period between 2014 and 2021, whilst, in the case of Feixas M., Gairin J., and Rodríguez-Gómez D., their research time-frame was between 2012 and 2016.

4. The authors Acosta T., Luján-Mora S., and Muñoz-Merino P. J., were the most productive authors in the shortest period of time, each publishing three articles. In the case of T. and Luján-Mora S., their articles were published between 2016 and 2017, whilst, in the case of Muñoz-Merino, P. J., their outputs were produced between 2019 and 2020.

Having described the sources and authors, analysis now proceeds to consider the conceptual makeup of university dropout by giving special attention to the keywords of

scientific works. This analysis serves to infer the lines of research around the topic, research trends and potential motives or explanations of students underlying university dropout. Firstly, as a means of providing a broader and more general picture of the topic, a keyword co-occurrence network map was developed, analysing results from *author's keywords* alongside *keywords plus* results. For this, an overall count of the number of times keywords appeared in the scientific documents was performed for all keywords appearing at least 4 times. In this sense, of the 793 keywords identified, only 47 reached this threshold. Figure 3 presents the co-occurrence map produced.

Figure 3

Co-occurrence map of all keywords

Next, in order to deepen understanding of the issue, the conceptual structure of scientific outputs on university dropout was examined via the analytical resource factorial approximation. In order to conduct this analysis, keywords retrieved from the scientific works were considered, including results provided both by *author's keywords* and *keywords plus*. To independent analyses were performed with the aim of detected whether any variation existed between the keywords provided by both types of search with regards to investigated issues, trends or topics. On the one hand, as indicated by its very name, *author's keywords* are words chosen by paper authors. They may be selected freely or under the constraints of a thesaurus and provide a way of synthesising the study topic in a specific and concrete way, making it possible to paint a specific picture through the thematic map of university dropout within the selected time-frame. On the other hand, *keywords plus* are automatically generated words and/or elements. In this case, they are generated by the WoS database according to the titles of the cited scientific documents. For this reason, they are terms that appear on at least two occasions within the bibliography. This type of keywords complements *author's keywords* by providing a more general view given that they are gathered in a more traditional and standardised way.

The application of factorial approximation serves to reduce data dimensionality and reduce it latent factors that are represented by a space characterised by less dimensionality. In the present case, multiple correspondence analysis (MCA) was employed

as a form of factor approximation and applied to *author's keywords* and *keywords plus*. Obtained outcomes are presented in Figures 4 and 5 through concept maps of the supported dimensions.

Figure 4

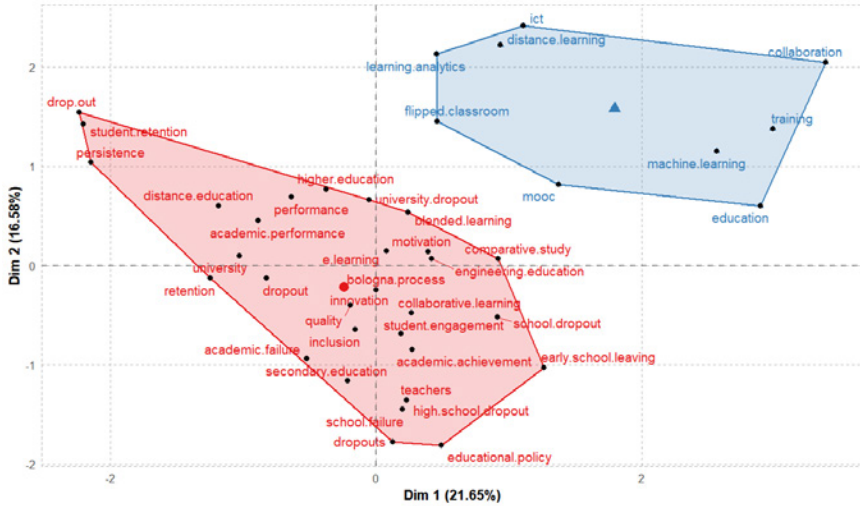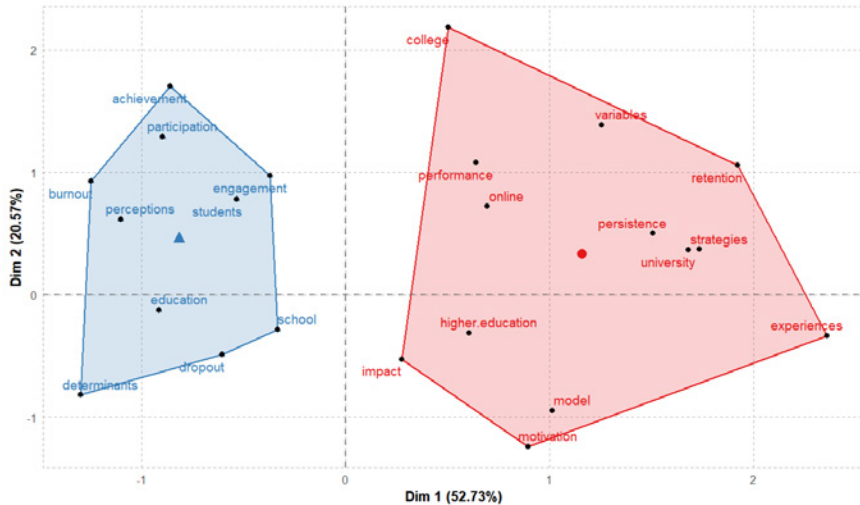*Concept map of dimensions emerging from author's keywords via the MCA method*

Figure 5

Concept map of dimensions emerging from keywords plus via the MCA method

Turning attention, first, to Figure 4, two large groupings are seen to emerge from *author's keywords*, with these differentiated in the map by the colours red and blue. Next, two dimensions are seen in which the explained variance pertaining to dimension 1 (horizontal axis) reaches 21.65% showing that it is the dimension that is best explained

by the data. With a lower proportion, dimension 2 (vertical axis) explains 16.58% of overall variance. The red grouping is made up by a total of 32 terms, whose positionings on the graph mark a specific distance from the start of the horizontal ($x=0$) and vertical ($y=0$) axes, indicating the average placement of each column profile. The main themes shared by the various sources in relation to the field of study are represented in this way. In this sense, for the red grouping, it was identified that a large number of *author's keywords* are related with components pertaining to *academic failure*. Around this key topic, terms such as *Bologna process*, *innovation*, *quality*, *inclusion*, *secondary education*, *dropout* and *retention* are found in relation to dimension 1. On the other hand, in relation to dimension 2, terms such as *higher education*, *performance*, *academic performance*, *distance education* and *persistence* can be highlighted. With regards to the blue grouping, this is made up of 9 terms that are positioned a long way away from the start of dimension 1 and, in contrast, much closer to the start of dimension 2. The main component of this grouping appears to be *learning methodologies*, underlining the value of technology through terms such as *machine learning*, *distance learning*, *MOOC*, *flipped classroom*, *learning analytics* and *ICT*. The blue grouping appears to be less relevant, overall, due to the fact that it is only explained by dimension 2.

With regards to Figure 5, two large groupings are again found in relation to *keywords plus*. On this occasion, the variance explained by dimension 1 rises to 52.73%, whilst that of dimension 2 reaches a height of 20.57%. With regards to Figure 4 pertaining to *author's keywords*, both groupings are seen to be positioned around more centrally graphed coordinates in accordance with both dimensions 1 and 2. In this way, the red grouping is composed by 13 terms, from which *motivation*, *model*, *impact*, *higher education*, *online* and *performance* stand out. The main component to emerge pertains to the *impact* of certain variables that are academic and personal in nature such as *motivation*, *performance* and *persistence*. All of these terms represent aspects which may influence students at the moment in which they may be likely to abandon their university studies. On the other hand, the blue conglomerate comprises 10 terms, with terms pertaining to the *dropout* component emerging as the most important and revealing a relationship with academic-psychological type variables such as *perceptions*, *engagement*, *participation* and *burnout*. All of these terms represent concepts that can also lead to university dropout.

Next, tighter relationships were established via the classification of keywords as a function of the relatedness between certain terms. For this, dendrograms were developed to graph *author's keywords* and *keywords plus* (Figures 6 and 7), keeping the same terms that had been used to configure the red and blue conglomerates shown previously in the concept maps. In this way, the distance between terms corresponds to shared commonalities. In other words, the fact that some keywords presented in the maps appear closer together than others is due to the existence of a large number of articles which include these terms together. In contrast, when terms appear further apart in the map, this is because these keywords appear together in only a small number of articles.

Figure 6

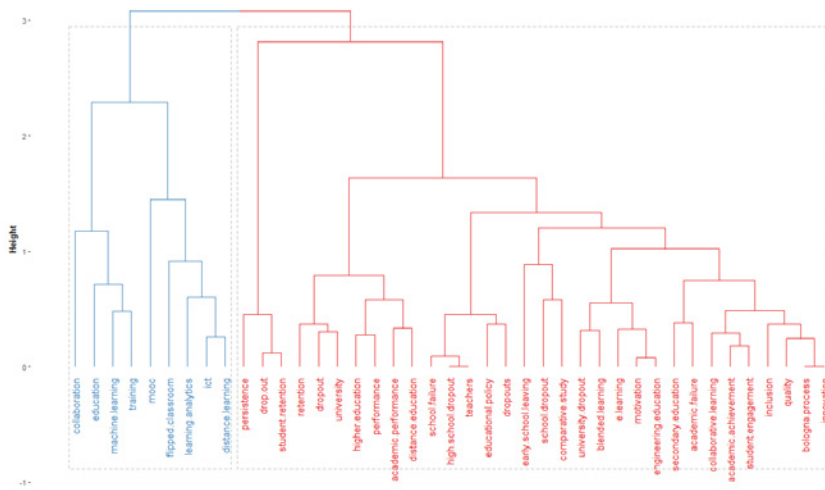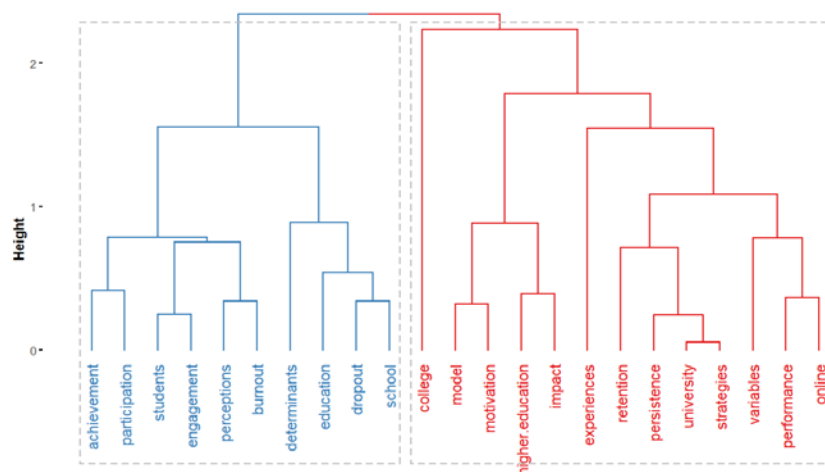*Dendrogram showing the distance (relatedness) between different author's keywords*

Figure 7

Dendrogram showing the distance (relatedness) between different keywords plus

Through the data given in Figure 6, the emergence of a number of issues of importance can be highlighted. With regards to the blue grouping, the closeness of terms comprising the sub-group made up of *MOOC*, *flipped classroom*, *learning analytics*, *ICT* and *distance learning* is notable. In consideration of the nature of these *author's keywords* it can be inferred that in-person learning is losing force at universities in the present day. Distance learning is increasingly opted for via modalities such as on-line or mixed learning, with a strong presence of new technologies. Nonetheless, it would be of interest to analyse the effects of the impact and influence of technology on stu-

dents given that, on a number of occasions, the lack of in-person teaching, contact in the classroom and the academic environment inherent to traditional teaching-learning processes, takes its toll on some students who end up walking away from their studies. Essentially, these new technologies and virtual settings impact on student perceptions of learning. With regards to the red grouping, subgroups and/or *author's keywords* pairings will now be highlighted as a means to providing more direct and meaningful information to tackle university dropout. Firstly, the pairing of *secondary education-academic failure* and the subgroup *'failure-high school dropout-teachers'* is highlighted. As mentioned in the discussion of the theoretical framework and reiterated here, university dropout does not only conform to issues inherent to the university system in itself. Instead, it is a broader and more general issue which encapsulates the very educational system, at all stages, although with higher levels of school failure seen at the earlier stages, alongside academic failure during the secondary education stage. In addition, the role and tasks taken on by teaching staff are also fundamental pieces of this process. Other aspects related with university dropout include educational policies at both a national and European level. In this sense, pairings relating to *Bologna process-innovation*, *educational policy-dropout* and *dropout-student retention*, and the subgroup formed by *retention-dropout-university* were found. Dropout is continually related with educational policies. Student retention is often questioned when the aim of policy to reduce dropout rates is not met and, even, the opposite effect is seen. Some of the reform and innovation projects delivered and the political decisions taken during the Bologna process could also be brought into question as potentially leading to higher dropout rates.

In the dendrogram presented in Figure 7, as performed in the previous analysis, firstly, with regards to the blue grouping, the *dropout-school* pairing stands out, reinforcing the aforementioned idea of failure as a prelude to university dropout. With regards to the academic and personal variables pertaining to students, the pairings of *students-engagement* and *achievement-participation* are also found. On this occasion, the scenario of university dropout could be linked to the degree of student commitment to their studies, whilst participation in and engagement with may also be reflected by academic achievement. Finally, a more psychological aspect was found in the *perceptions-burnout* pairing. In this sense, exhaustion or "burnout" syndrome arising in students at a given time could have the ultimate academic consequence of university dropout. With regards to the red grouping, distance or online learning continues to impact on performance, as seen in the subgroup composed by performance-online variables, retention policies and strategies, and student persistence in their studies. This is demonstrated through the *retention-persistence-university-strategies* subgroup. In addition, a final, more personal and psychological aspect, that of motivation to undertake a period of studies, emerges in the *model-motivation* pairing.

Discussion and conclusions

Throughout the present article, the different causes and motives behind which university dropout continues to be a major issue in the university system around the world and, specifically, in Spain, have been examined. Existing literature, consisting of various articles and doctoral theses specialised on the topic, provides a degree of clarification in relation to the issue. Specifically, it contributes different models and approaches pertaining to dropout and retention, information on the impact of univer-

sity dropout rates on the institution and, finally, proposals for the prevention of this phenomenon.

Firstly, the main sources of information in Spain were highlighted according to areas considered in the scientific literature as indicated by the Law of Bradford. This enabled the identification of 11 academic journals, with the journal entitled 'Revista de Educación' standing out as publishing the greatest number of articles on the topic of university dropout and for accumulating the greatest number of citations during the examined time-frame (2002-2021). The scope of the journals and its impact within the scientific community were the main reasons for which these journals were chosen by authors when striving to publish work.

Secondly, the most prolific authors over the two examined decades were identified and it was possible to confirm that no single author (10 or more publications) emerged with a large output, with most authors only venturing occasionally into the investigated field. Indeed, the most productive authors were found to have around four published articles.

Thirdly and finally, analysis around the handling of keywords was conducted (co-occurrence analysis, factorial approximation and conglomerate analysis). Main themes were identified applying a threshold of 4 occurrences within either *author's keywords* or *keywords plus* (Figure 3). Nonetheless, themes were then analysed at a deeper level through factorial approximation via multiple correspondence analysis (Figures 4 and 5), although, this time, *author's keywords* and *keywords plus* were considered separately. Four relative/principal components in relation to these two pillars were detected, namely, academic failure, learning methodologies, impact and dropout. The remaining themes rotate around these components. These being trends, issues and variables such as performance, distance learning, educational policies, motivation, persistence, commitment and achievement, amongst other. Aside from uncovering these topics, an analysis of the relatedness of terms was conducted (Figures 6 and 7), through which findings were expanded and given greater depth. In this way, it was possible to confirm the existence of many different sources examining university dropout. On the one hand, sources relating to educational policies and innovation were found to increasingly rely on technology, whilst in-person teaching was seen to be on the decline. This went hand in hand with academic and school failure at early educational stages, giving a clear warning sign of what to expect in secondary education and high existing dropout. On the other hand, sources were found that relate to more personal aspects of students at speak to their journey through university and their way of approaching their studies. These sources considered variables such as motivation, commitment, dedication, persistence, engagement, achievement and burnout.

In this way, proposed research aims were addressed by the present research. It serves to highlight the main limitations of the present research. The first was due to the time at which examined articles were gathered (December 2021). It is possible that some articles on the topic of academic dropout were missed, with some works about to be published or in-press potentially not being included. Thus, the 20 years considered in the present study may not have corresponded to the totality of these 20 years. The second limitation relates to the databases considered. Whilst *Web of Science* is deemed to offer full and specific coverage, especially in the field of education where it considers various specific topic areas related with the present discipline, the inclusion of another database such a *Scopus*, *Eric* or *ProQuest* could have provided a richer and more complete picture of available data. Nonetheless, these limitations can provide the basis from which future research can be built to continue the line of research started by

the present work. Further, the scope of the research could also be broadened to look beyond the national setting and examine the topics and issues underlying university dropout in the rest of Europe and the wider world.

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