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Combining sport and academic career: Exploring the current state of student-athletes' dual career research field

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ABSTRACT

Understanding the Dual Career as the process of combining the athletic career with an academic career or work, the main purpose of this paper is to study the current state of research on this reality. Based on this, a review of the scientific literature published in journals indexed on the Web of Science has been performed. This review consists of a bibliometric analysis, which provides basic bibliometric indicators, the co-authorship and keyword networks, and a thematic analysis of the search. Secondly, a systematic review of the most representative documents of each thematic cluster has been carried out. The results indicate that research on Dual Career is in an intermediate state, where there is a growing interest during the last years, and show that Europe is the main focus of research on this reality, despite the need of further research considering non-European terms to refer to this reality. The paper provides an overview of Dual Career research's current state and may serve as a starting point to guide future research, and help education and sport policy makers to develop better measures to facilitate student-athletes' Dual Career.

1. Introduction

At present, elite sport is undergoing an important professionalization process, which means that athletes spend a large part of their time training and competing (Vilanova & Puig, 2013). In this sense, Wylleman et al. (2013) explain that the development of a high-level sports career requires an enormous dedication in the years before it, in which the athlete acquires the skills and experience necessary to be able to compete at the highest level and turn this sports practice into a profession. However, as in all professional fields, it is clear that there is a day when this sports career ends.

Because these careers end prematurely compared to other professional careers, Mateu et al. (2018) emphasize that some of these elite athletes who finish their sports careers must live from another professional activity. In line with this, some studies, such as that of Aquilina (2013) and Puig and Vilanova (2006), shows that an adequate balance of the sports career and academic life allows athletes to face the transition process more efficiently. This conciliation also enables the preparation of an alternative working life outside the

Abbreviations: DC, Dual Career; WoS, Web of Science; TGCS, Total Global Citation Score; TLCS, Total Local Citation Score; IF, Impact Factor; JCR, Journal Citation Reports.

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sports world after the sport's retirement. As a result of this combination of careers, the concept of Dual Career was born, which becomes the subject of this study.

Dual Career (DC) is defined as "the combination of elite sport and education" (European Commission, 2012). It is a growing topic within the sociology and psychology of sport since it attracts institutions' interest because of the importance of transitions within sports careers (López-Chamorro & Simón, 2018). At the European level, the term "dual career" has recently been introduced to identify the specific challenges elite athletes face when combining sports practice and educational-professional training (Debois et al., 2015; Guidotti et al., 2015). Under this same perspective, the European Commission (EC) created, in 2012, the EU Guidelines on Dual Career of Athletes, which constitute a reference framework on this reality, which contributes to the general well-being of the athlete and the achievement of the maximum of his/her sports possibilities (Moreno-Castellanos et al., 2018). DC's reality is relatively new, since the term "dual career" officially appeared in the European Commission's White Paper on Sport in 2007 (Guidotti et al., 2015).

Research on DC has revealed an emerging academic conversation about the dimensions of the DC and a methodological variety of DC studies in Europe. Besides, early research also found that the DC concept's use was not well established, as in many cases, the scientific literature used it for other non-athlete-scholar topics (Guidotti et al., 2015). These same authors highlighted the need for the systematic use of the DC concept by the entire scientific community to investigate student-athletes' challenges when combining sport with academic/professional training.

Considered a benchmark for research on DC, the review by Guidotti et al. (2015) explains that, at the time of publication of their analysis, DC research was somewhere in between. One of the most important contributions of Guidotti et al.'s (2015) review was the classification of the existing literature according to the DC dimension referred to in those studies. In this way, and based on the conceptualization of the environment in terms of nested systems (Bronfenbrenner, 1979), four dimensions of the student-athlete study were established: micro (individual), meso (interpersonal), macro (social), and global (political).

Another recent study that provides relevant information about DC's state of research is the review of Stambulova and Wylleman (2019). It is a study that includes essential information about where and how DC research is flowing in Europe. Another aspect to consider is that it is a review that acts as a continuation of the previously presented (Guidotti et al., 2015), since it only includes the literature from 2015 to 2018.

Confirmed the growing academic interest in the dimensions of the DC in Europe, and revised the classification and conclusions of Guidotti et al. (2015), Stambulova and Wylleman (2019) carry out their study to present the current state of DC literature written in English, to situate DC research from the psychological side within the sports career discourse and within the DC discourse in Europe, and to identify research gaps and future challenges in the field. The main gaps identified in research on DC include the scarcity of data on DC in sport and work in the world of work, the costs of DC and critical transitions in DC, developmental environments from a holistic perspective, mental health, lifestyle and well-being of athletes developing a DC, and the study of the content and evaluation of DC support programs, among others (Stambulova & Wylleman, 2019).

This study aims to achieve some knowledge that will later distinguish the most important perspectives and aspects of DC's research and highlight which are future directions of DC research in the educational domain. To this end, this article reviews the published literature on DC, which allows for an increase in knowledge about reality and provides the scientific community with greater insight into the current state of research. Educational system plays an important role in the DC reality, especially the higher education level in terms of further employability. Knowing and understanding the perspectives in research and how different factors contribute to the integrated 1development of individual athletes to reach their potential in sports, education, and their post-sport career employment is important for theorists, DC practitioners, and stakeholders working with DC athletes (Robnik et al., 2021). As Robnik et al. (2021) highlight, to develop a sufficient mechanism, DC support providers should consider supporting education during their sports careers and recognizing study-training ecosystems, based on good practices to successfully transition to their post-sport careers.

Although there are recent studies that pursue similar objectives through systematic reviews of the literature (Guidotti et al., 2015; Park et al., 2013; Stambulova & Wylleman, 2019), this study provides a novel design, which has not yet been used in research on DC, and which is being used in similar studies, but on different subjects, e.g., Peset et al. (2013). Specifically, it involves a review of the literature based on bibliometric analysis and the subsequent systematic review of the documents in light of the results obtained in this analysis (e.g., Bartolacci et al., 2019; Calabuig et al., 2020; Duque & Cervantes-Cervantes, 2019; Grosseck et al., 2019).

In contrast to the methodology used in this study, in their literature review, Guidotti et al. (2015) classify the studies resulting from the search according to the dimensions of DC they establish (micro, meso, macro and global). They also classify them according to the methodological approach and design they use and the type of sample used in the studies. On their own, Stambulova and Wylleman (2019), offer some tables in which they present the most important aspects of each document: authors, main focus, frame of reference to which they stick, methodology, sample and main findings, from a quantitative perspective. According to Stambulova and Wylleman (2019), this quantitative part is useful for charting progress within the EU Dual Career discourse following the systematic review of Guidotti et al. (2015). The second perspective used by both studies is a qualitative mapping of the most important contributions of the research.

Regarding the methodology used in this study, which is an added value, bibliometrics provides a structured analysis of a large block of information to infer trends over time, subjects researched, identify changes in the boundaries of disciplines, detect the most prolific researchers, countries, and institutions, and present the map or drawing of existing research (Aria & Cuccurullo, 2017).

Using this novel approach and the methodology presented below, this study aims to determine the current state of DC research in the international context and, above all, to make known the different perspectives or themes being researched in this field.

Hence, the following research questions will guide the study design:

(1) RQ1 - What is the evolution of the articles published on DC over time?

(2) RQ2 - Which authors have published the greatest number of articles on DCs, and which have been most cited?
(3) RQ3 - Which countries, academic journals and institutions have published the most on the DC subject, and what is the impact factor of these journals?
(4) RQ4 - What co-authoring and keyword networks exist in DC research?
(5) RQ5 - What are the main themes studied within this field of research?

The structure of the document is organized as follows. Firstly, the methodology is presented with details of the bibliometric methodological techniques and computer programs used in this study (Section 2). The results are then presented and discussed using bibliometric tables and maps (Section 3). Finally, the conclusions, implications for future research, and the study's limitations are presented (Section 4).

2. Material and method

2.1. Data collection

A search was conducted on the Web of Science (WoS) Main Collection™. WoS was selected because it is considered one of the main databases since it covers a wide number of journals worldwide and involves scientific research in various fields of knowledge (Duque & Cervantes-Cervantes, 2019). It has also been selected in a large number of bibliometrics, e.g., Bartolacci et al. (2019), Calabuig et al. (2020), Duque and Cervantes-Cervantes (2019).

An advanced search was performed on the WoS Main Collection with the field tag TS, which refers to the Theme, so that the terms in the equation are searched in the following fields: title, abstract, author keywords and keywords plus. The search equation has been developed after combining and modifying the terms used in the studies of Guidotti et al. (2015) and of Stambulova and Wylleman

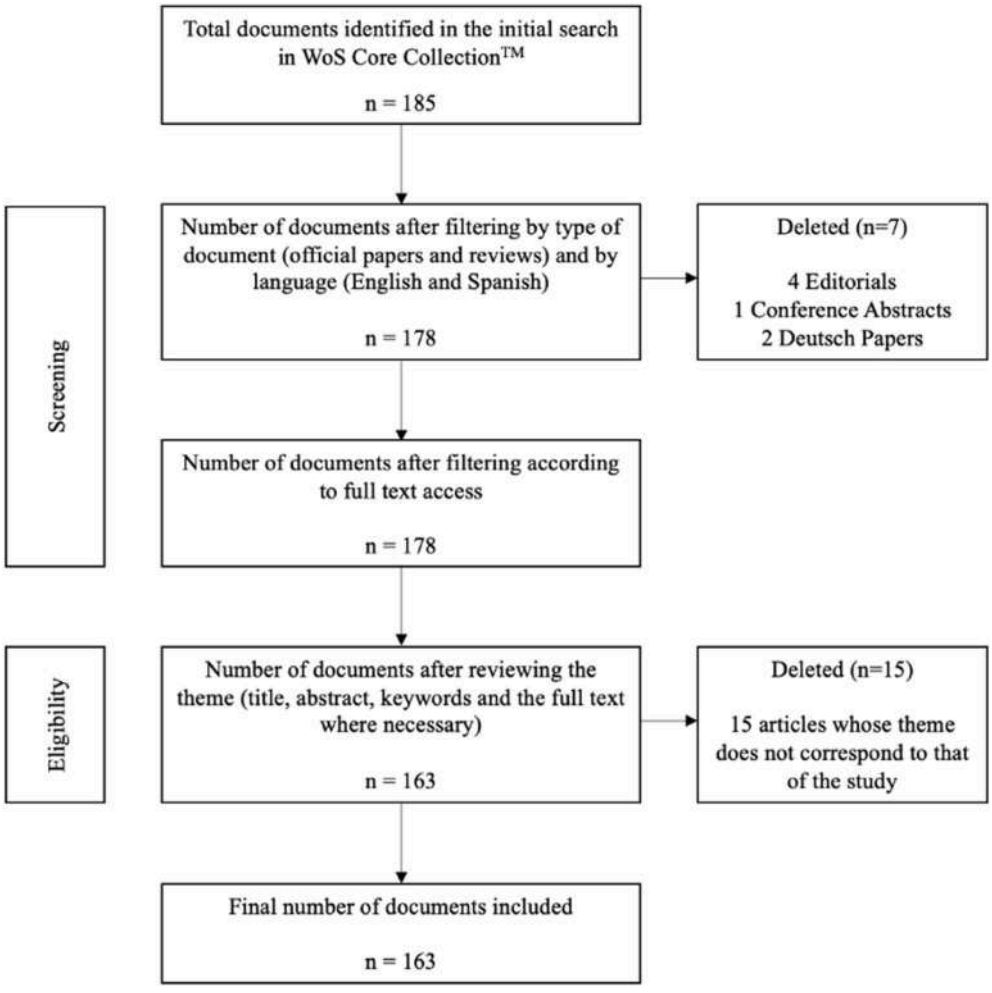


Fig. 1. PRISMA flow diagram detailing steps in the identification and screening of sources.

(2019), since they are the latest more complete revisions made on this field, incorporating also other new concepts in the equation. The search equation used was: TS = (((“Dual career*") AND (sport*))OR (“Dual career* athlet*") OR ((“Dual career*") AND (“student-athlet*")) OR ((“Dual career*") AND (“pupil-athlet*"))OR (“employee-athlet*") OR (“combination of sport*and educat*") OR (“combination of sport* and work*") OR (“elite sport* and educat*") OR (“elite sport* and employ*") OR (“Dual career* competenc*") OR (“Dual career* transition*") OR (“athletes’ transition* to the universit*") OR (“Dual career* and athletic retire*") OR (“Dual career* and athletic identit*") OR (“Dual career* in sport* support*") OR (“Dual career in sport* support* provider*") OR (“Dual career* in sport* assistance program*") OR (“Dual career* in sport* and gender/women/men”) OR (“elite athlet* and educat*") OR (“elite athlet* and universit*") OR ((“career develop* and transition*") AND athlet*) OR (“holistic athlet* develop*") OR (“athlet*develop* environment*") OR ((“career assistance program*") AND “elite athlet*")).

The following indicators (1900-present) were used to search for the WoS Main Collection™: WoS Main Collection, Current Contents Connect, Derwent Innovations Index, KCI - Korean Journal Database, MEDLINE, Russian Science Citation Index, and SciELO Citation Index. Besides, the WoS Main Collection citation indexes used have been Science Citation Index Expanded (1900-present), Social Sciences Citation Index (1956-present), Arts & Humanities Citation Index (1975-present), and Emerging Sources Citation Index (2015-present).

The search was conducted on September 1st, 2021. It is crucial to present the documents’ data collection because the database changes and is continuously updated (Liu et al., 2015). The result of the search was 185 documents. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach was adopted to review and select the documents from the literature search (Moher et al., 2010). The criteria for selecting valid research documents were determined to be official papers and reviews. After filtering the results and eliminating other types of documents, the search was reduced to 180 papers. Of these 180 documents, two which full text was only in German were eliminated, leaving 178 papers. In this way, the screening process ineligible records were deleted (n = 7).

These 178 documents underwent a manual review to ensure that the database’s articles fit the subject matter (eligibility) suggested in different studies (e.g., Calabuig et al., 2020; González-Serrano et al., 2020). The review was conducted by reading the titles, keywords, and abstracts of all the documents. 1 In this way, out of 178 papers, 15 were eliminated because they did not conform to the study’s subject matter, leaving 163 in the end. The data can be seen in Fig. 1.

2.2. Data analysis

First, the missing information on the records of the selected documents was completed, and the names of the authors were standardized. When carrying out studies of this type, as Calabuig et al. (2020) explain, it is crucial to know the number of publications that each researcher has. However, it is also extremely relevant and useful to know the journals’ quality in which these researchers publish. For this reason, a bibliometric analysis of quality and quantity has been carried out, and this analysis has been done in two different phases.

In the first of the two phases, the different basic bibliometric indices have been calculated: the number of articles published per year, per author, per country, per institution, and journal. To carry out this first phase, the HistCite statistical software has been used (version 12.3.17; HistCite Software LLC, NY, USA). Although the quantity indices report on the total number of documents given in each field (year, author, country, etc.), the quality indices used in the study have been of citation frequency, considering both the total global citation score (TGCS) and the total local citation score (TLCS). The TGCS consists of the number of times a document included in the search has been cited in the WoS Main Collection. TLCS consists of the number of times a document included in the search performed has been cited by other documents found in the same search (Bartolacci et al., 2019). These indicators have also been calculated through HistCite software.

Subsequently, a co-occurrence analysis was carried out to determine the relationships between authors and keywords. This analysis was performed through the program BibExcel (version 2016.02.20; Olle Persson, University of Umea, Umea, Sweden), used to analyze the co-authorship network keywords generate the document to create the networks’ maps. Subsequently, the program Pajeck (version 5.08, 2013.11.12; Batagelj and Mvar, University of Ljubljana, Ljubljana, Slovenia) was used to draw and visualize the resulting bibliometric maps. When viewing the maps, the vertex’s size corresponds to the number of articles published or that keyword’s occurrence. The larger the size, the more times it has appeared. On the other hand, the line’s thickness joining the vertices indicates the number of collaborations or joint occurrences. The greater the thickness, the greater the number of collaborations or joint appearances in publications.

The last step was to carry out a thematic analysis through a bibliographic coupling. This analysis consists of measuring the similarity between documents, identifying the number of references they share, and assuming that the degree of common references between two articles indicates the similarity in the subject under investigation (Vogel & Güttel, 2013). Since the number of references cited in the articles does not change over time, the bibliographic coupling is a tool that is not influenced by the time of the analysis. Therefore, it is considered particularly useful when used to conduct systematic literature reviews (Bartolacci et al., 2019), as is the case in this paper. The VOSviewer software (version 1.6.13; Ness Jan van Eck and Ludo Waltman, Leiden University, Rotterdam, Netherlands) has been used to perform it.

2.3. Assessment of literature according to identified themes

Subsequently, the different thematic groups resulting from the bibliographic coupling were examined and assessed in detail. This analysis has been done to ensure that, from a qualitative point of view, the grouped articles investigate the issues that are aggregated

within the different streams or areas of DC research. In this way, the papers have been read and analysed qualitatively, in line with the systematic literature review (Bartolacci et al., 2019).

By obtaining the subject groups through the bibliographic coupling, the documents in each group were sorted according to the number of citations received in the WoS Main Collection. The four documents with the highest number of citations in each group were selected for analysis since they are considered the most relevant and representative studies of each thematic block. An Excel file (version 2019) was created where the necessary information was collected, based on the PRISMA statement list (Urrútia & Bonfill, 2010). This information was used to identify trends, methodologies used in DC research, topics of interest, and gaps.

3. Results and discussion

A total of 163 documents were found, published in 58 journals, written by a total of 386 authors from 204 different institutions and 40 different countries. The results obtained from the analyses performed in response to the research questions posed are presented below.

3.1. Basic bibliometric indicators

In this first section of the results, the basic bibliometric indicators are presented. It presents the evolution of publications by year, the number of publications and citations by author, institution, country, and the journals in which these documents have been published.

3.1.1. Years of publication

About RQ1, the first article on this subject was published in 1992. However, it can be seen that production is considered to be zero until 2009. It should be noted, as mentioned in previous sections, that the use of the term "Dual Career" was first used to identify the combination of elite sport and education in Europe, in the White Paper on Sport of the European Commission in 2007 (Guidotti et al., 2015).

Between 2009 and 2014, the number of publications was relatively low and stable. From 2015 onwards, a considerable growth in the number of publications can be observed which, despite a notable decrease in 2016, has remained above 15 publications until 2021, when there are currently 35 publications registered up to the date of the search (September 1, 2021). The year with the highest number of publications is 2021. Fig. 2 shows the evolution mentioned above.

There is a growing interest in DC research over the last few years. Despite possible differences in search equations and the range of databases consulted, Guidotti et al. (2015) report growing interested from 2007 to the year of publication of their study. As this research shows, the number of publications had grown considerably since 2014, especially in 2015, when 20 documents were published. It is important to mention, in relation of this growing number of publications, that two special issues on DC had taken place during this period: 2015, in Psychology of Sport and Exercise journal; and 2020, in Sport in Society journal. On the other hand, the review by Stambulova and Wylleman (2019) highlights the considerable increase in the number of publications from 2015 onwards, in the same way as the annual evolution of the number of publications in this study (Fig. 2).

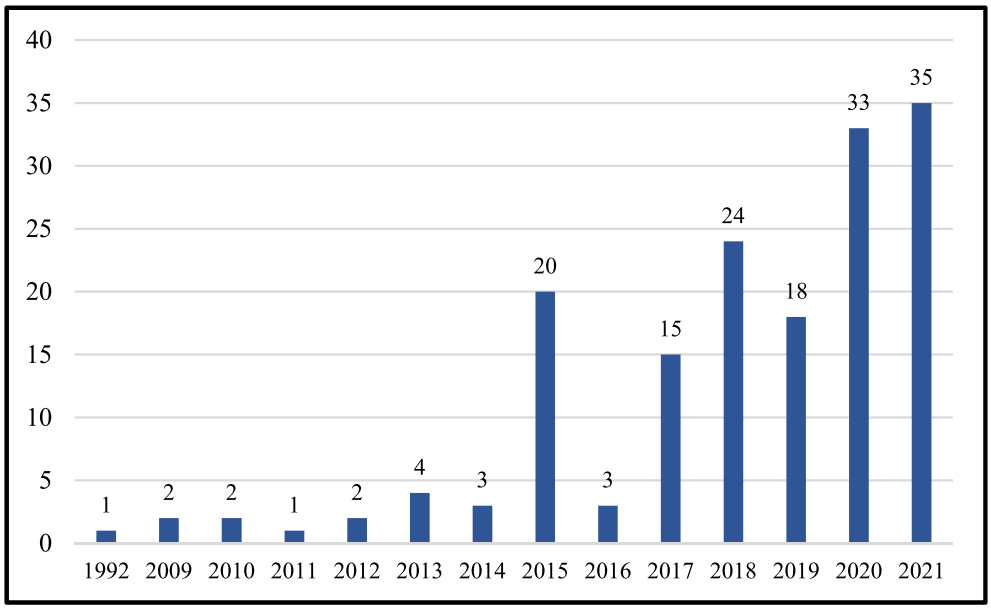


Fig. 2. Annual evolution of the number of documents published on DC in the WoS.

It should be noted that the growing interest and publication on DC since 2013, specifically since 2015, has been influenced by two key moments: (1) the publication of the EU Guidelines on CD in 2012, which led to a bigger political attitude of the EU on this reality, and (2) the Erasmus+ 2014–2020 funding period of the EC, through which a relevant budget was allocated to support transnational collaborations and partnerships in different areas, including DC (European Commission, 2016b). During this period between 2014 and 2020, a total of 66 DC-related projects have been developed, involving a total investment of €11,235,479.19 of the budget set for the Erasmus+ 2014–2020 programme (€14,774,000,000), as outlined by the (European Commission, 2016a). This funding and the increased political concern in member states has meant a significant boost to research on the topic addressed in this study.

3.1.2. Most productive authors on dual career

About the authors who publish on dual career, and responding to RQ2, we have found a total of 386 researchers who have published on the subject. The most productive authors are T.V. Ryba, with 19 publications, followed by L. Capranica with 15 publications, M. Torregrossa with 13 publications and N.B. Stambulova with 12. On the other hand, the author with the highest number of citations (TGCS and TLCS) is N.B. Stambulova, followed by T.V. Ryba and P. Wylleman. Table 1 shows the list of authors according to the number of publications, highlighting the most productive ones, with a total of six or more publications on DC.

3.1.3. Journals that publish about dual career

Concerning RQ3, a total of 58 journals indexed in the WoS were found to have published at least one specific article on the subject of this study. Of all the journals, the journal *Psychology of Sport and Exercise* is the one with the highest number of publications on the subject, with 27 publications, and it is also the journal that has received the highest number of citations, TLCS = 388 and its TGCS = 490. As can be seen in Table 2, this journal stands out from the rest that have published on the subject. The second most productive journal is *Cultura, Ciencia y Deporte (CCD)*, with a total of 11 publications.

Another aspect considered in the analysis of journals has been its Impact Factor (IF). The journal with the highest IF in JCR is *Psychology of Sport and Exercise* ($IF_{2020} = 4.785$, Q1).

3.1.4. Most productive countries

Following RQ3, researchers from a total of 40 countries have been found to have published at least one article on the subject of the study. As shown in Table 3, the country with the highest number of publications is Spain with 37 publications, followed by the UK with 28, Finland with 23 publications and Italy with 21 publications.

An important difference identified in this paper's approach compared to the other reviews is that this paper assesses research at a global level and does not restrict it geographically, while Guidotti et al. (2015) and Stambulova and Wylleman (2019) focus only on the European DC discourse. However, this paper's results show that many of the studies identified belong to this European context analysed by the authors.

3.1.5. Institutions

Of the 163 publications registered after the search, and in response to RQ3, it is noted that researchers from 204 different institutions have participated in them. Among the institutions with the highest number of publications on the subject, and as can be seen in Table 4, the Università degli Studi di Roma "Foro Italico" (Italy) and the University of Jyväskylä (Finland) stands out with 18 publications, followed by the Universidad Autónoma de Barcelona (Spain) with 12 publications.

Table 1
Most productive authors on DC (6 or more publications).

Author	Institution	Country	n	TLCS	TGCS
T.V. Ryba	Jyväskylä University	Finland	19	91	102
L. Capranica	University of Rome Foro Italico	Italy	15	90	82
M. Torregrossa	Autonomous University of Barcelona	Spain	13	53	77
N.B. Stambulova	Halmstad University	Sweden	12	195	366
K. Aunola	Jyväskylä University	Finland	11	55	54
C. López de Subijana	Technical University of Madrid	Spain	11	2	32
P. Wylleman	Vrije University Brussel	Belgium	10	107	99
M. Doupona Topic	Ljubljana University	Slovenia	10	46	50
N.J. Ronkainen	Jyväskylä University	Finland	9	48	55
F. Guidotti	University of Rome Foro Italico	Italy	8	59	71
C. Lupo	University of Rome Foro Italico	Italy	7	48	56
H. Selänne	Jyväskylä University	Finland	6	64	73
Y. Ramis	Autonomous University of Barcelona	Spain	6	41	47
M. Sorkkila	Jyväskylä University	Finland	6	24	32
5 investigators	.	–	5	–	–
9 investigators	–	–	4	–	–
25 investigators	–	–	3	–	–
54 investigators	–	–	2	–	–
279 investigators	–	–	1	–	–

Note: groups of investigators who have the same number of publications have been made to don't extend.

Table 2
Most productive journals on DC (3 or more publications).

Journal	n	TLCS	TGCS	IF (2020)
Psychology of Sport and Exercise	27	388	490	4.785 (Q1)
Cultura, Ciencia y Deporte	11	0	12	–
International Journal of Sport and Exercise Psychology	11	48	233	3.304 (Q2)
Kinesiologia Slovenica	10	72	67	–
Frontiers in Psychology	9	0	1	2.990 (Q2)
Sport in Society	8	17	8	1.725 (Q3)
Revista de Psicología del Deporte	6	5	22	–
European Journal for Sport and Society	4	14	16	–
Journal of Applied Sport Psychology	4	0	1	3.585 (Q1)
Plos One	4	0	12	3.240 (Q2)
Sport Exercise and Performance Psychology	4	13	41	4.250 (Q1)
International Journal of the History of Sport	3	83	109	0.648 (Q2)
International Journal of Sport Policy and Politics	3	68	65	–
European Journal of Sport Science	3	35	32	4.050 (Q1)
European Sport Management Quarterly	3	2	3	4.000 (Q2)
International Journal of Environmental Research and Public Health	3	0	1	3.390 (Q2)
8 journals	2	–	–	–
34 journals	1	–	–	–

Note: groups of journals that have the same number of publications have been made to don't extend.

Table 3
Most productive countries on DC (11 or more publications).

Country	Publi.	TLCS	TLCS/publi.	TGCS	TGCS/publi.
Spain	37	58	1,57	119	3,22
United Kingdom	28	176	6,29	221	7,89
Finland	23	106	4,61	114	4,96
Italy	21	92	4,38	95	4,52
Germany	19	74	3,89	312	16,42
Sweden	16	226	14,13	395	24,69
Slovenia	15	91	6,07	88	5,87
Denmark	13	76	5,85	116	8,92
Portugal	13	34	2,62	33	2,54
Belgium	11	107	9,73	116	9,09
Australia	11	43	3,91	71	6,45
2 countries	8	–	–	–	–
1 country	7	–	–	–	–
4 countries	6	–	–	–	–
1 country	5	–	–	–	–
2 countries	4	–	–	–	–
2 countries	3	–	–	–	–
5 countries	2	–	–	–	–
12 countries	1	–	–	–	–

Note: groups of countries that have the same number of publications have been made to don't extend.

3.2. Co-occurrence analysis

This sub-section presents the results obtained from the co-occurrence analysis, which respond to RQ4: firstly, co-authorship networks and, secondly, keyword networks.

3.2.1. Co-authorship

A threshold of a minimum of three or more collaborations between authors has been established for such connections to appear on the network. In Fig. 3, six co-authoring networks can be seen. These co-authoring networks vary in size (number of authors) and in the number of collaborations between authors. The biggest network is made up of seven researchers and there are two more networks with six authors each one. Then, two networks are made up of five authors and the smallest one with just three authors.

Among the networks obtained, the relationship between the authors T.V. Ryba and K. Aunola stands out with 11 joint publications, the relationship between T.V. Ryba and N.J. Ronkainen with seven joint publications, and the relationship between T.V. Ryba and M. Sorkkila, T.V. Ryba and H. Selänne, and between K. Aunola and M. Sorkkila, with six joint publications in the three cases. On the other hand, it is also worth mentioning the relationship between L. Capranica and M. Doupona Topic, with ten publications, and the relationship between L. Capranica and F. Guidotti, with six joint publications. Finally, also highlight the relationships between M. Barriopedro and J.L. Chamorro with C. López de Subijana, with five publications, and M. Torregrossa and Y. Ramis, with six joint publications.

Table 4
Most productive institutions on DC (5 or more publications).

Institution	Publi.	TLCS	TLCS/publi.	TGCS	TGCS/publi.
Università degli Studi di Roma Foro Italico	18	90	5,00	93	5,17
Jyväskylä University	18	64	3,56	59	3,28
Universidad Autónoma de Barcelona	12	53	4,42	77	6,42
Halmstad University	11	195	17,73	366	33,27
Ljubljana University	11	47	4,27	51	4,64
Coimbra University	11	34	3,09	32	2,91
Universidad Politécnica de Madrid	11	2	0,18	6	0,55
Vrije Universiteit Brussel	8	102	12,75	97	12,13
Universidad Europea de Madrid	7	2	0,29	4	0,57
University of Southern Denmark	6	37	6,17	61	10,17
Stirling University	6	2	0,33	4	0,67
Universität Leipzig	5	54	10,80	286	57,20
Loughborough University	5	55	11,00	67	13,40
Aarhus University	5	51	10,20	56	11,20
German Sport University Cologne	5	0	0,00	1	0,20
5 universities	4	–	–	–	–
9 universities	3	–	–	–	–
27 universities	2	–	–	–	–
148 universities	1	–	–	–	–

Note: groups of universities that have the same number of publications have been made to don't extend.

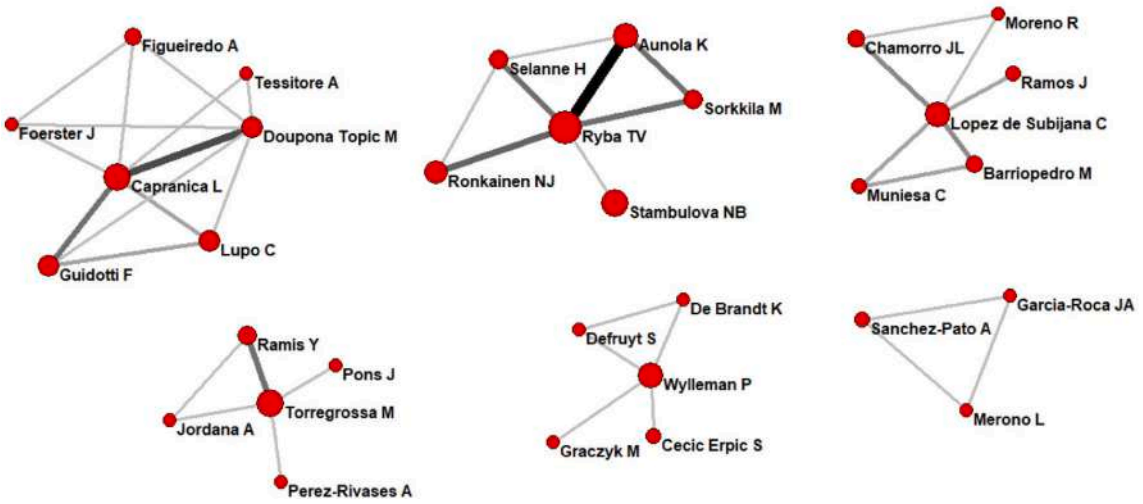


Fig. 3. Co-authorship networks in DC research (3 or more collaborations).

3.2.2. Co-word analysis

The following are the keyword networks. For this process, the criterion of a minimum of two joint appearances of the keywords has also been included. As shown in Fig. 4, a total of two keyword networks have been obtained. Of these, one large network stands out, made up of 38 key words; and one small network made up of only two key words, which have appeared related in at least two different documents.

Analysing the networks, it is worth highlighting the strong relationship between the terms "dual career", on the one hand, with "elite sport", and on the other, with "student-athletes". Other relationships to be highlighted are those existing between the terms "dual career" and "sport", "education" and "career transition". Finally, the last strong relationship found is the existing between "sport" and "education".

3.3. Thematic analysis

At this point, the results obtained from the thematic analysis of the search are presented, through the bibliographic coupling. The main criterion established to include the documents in this analysis has been that the minimum number of citations in a paper should be seven or more. Of the 163 articles registered in the search, 42 articles exceed the minimum of seven citations. Thus, Fig. 5 presents the result obtained after this analysis.

As shown in Fig. 5, the five resulting clusters are interconnected, thus confirming the search chain's effectiveness aimed at

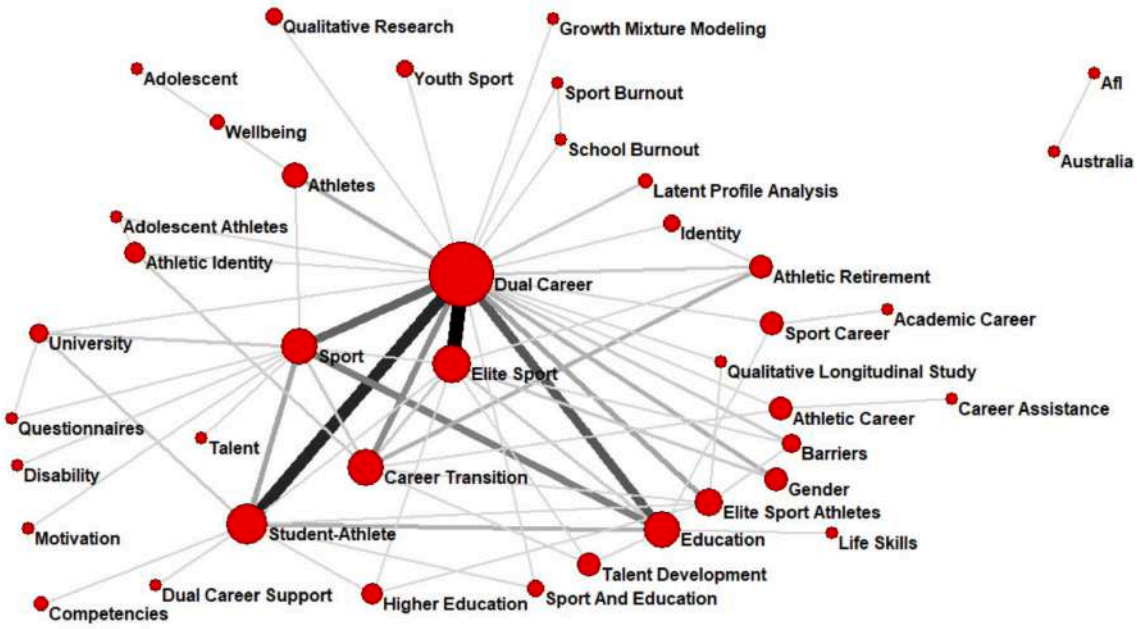


Fig. 4. Keyword networks in DC research.

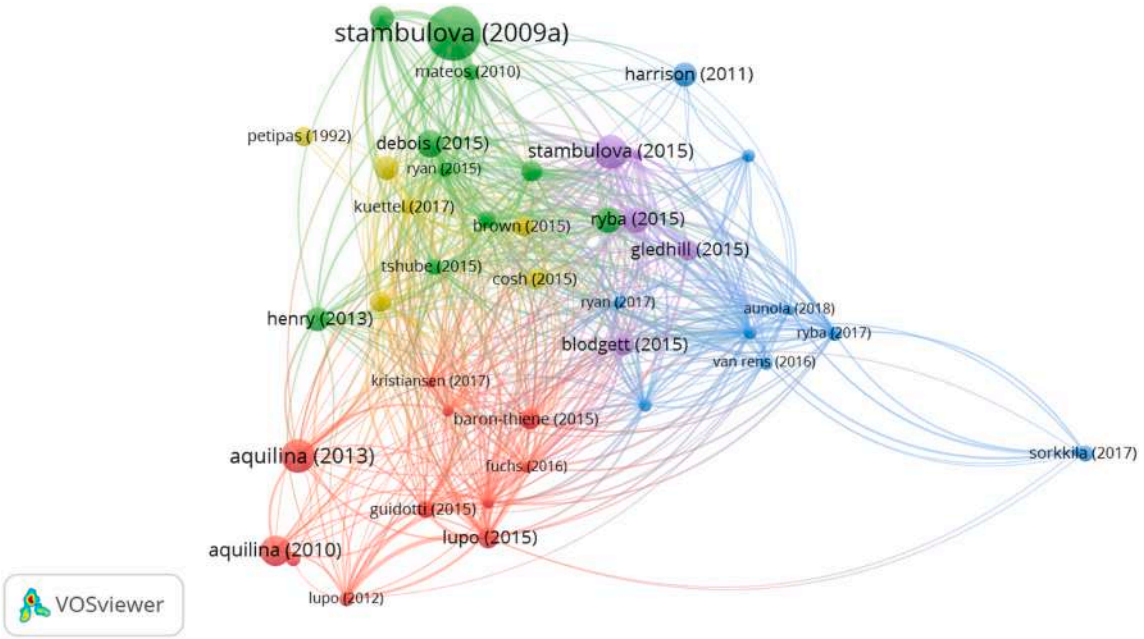


Fig. 5. Bibliographic coupling analysis.

investigating a coherent body of knowledge (Bartolacci et al., 2019). Therefore, the clusters are interrelated with each other, and there are no clear boundaries. It indicates that DC research does not follow completely independent paths or fields but is all related. The results show five different but interconnected clusters within this field of research: Cluster 1 (red), Cluster 2 (green), Cluster 3 (blue), Cluster 4 (yellow), and Cluster 5 (purple).

Table 5 shows the documents obtained after the bibliographic coupling are presented, divided according to the cluster to which they belong and ordered according to the number of citations each has in the WoS Main Collection. After a more exhaustive review and analysis of the four most relevant articles in each cluster, the main findings, aspects, and characteristics that define each thematic group are presented below and, consequently, help determine DC research's current state. In response to RQ5, the different clusters or

Table 5
Documents recorded by DC thematic clusters.

Authors	Year	TGCS	Authors	Year	TGCS
Cluster 1 (TGCS = 262): European context and support policies					
1. Aquilina	2013	72	7. Lupo et al.	2012	13
2. Aquilina and Henry	2010	56	8. Fuchs et al.	2016	9
3. Lupo et al.	2015	28	9. Lupo et al.	2017	9
4. Baron-Thiene and Alfermann	2015	26	10. Geraniosova and Ronkainen	2015	8
5. Guidotti, Cortis, and Capranica	2015	20	11. Kristiansen	2017	7
6. Borggrefe and Cachay	2012	14			
Cluster 2 (TGCS = 437): Sports career development and transitions					
1. Stambulova et al.	2009	183	6. Tekavc, Wylleman, and Erpič	2015	28
2. Debois, Ledon, and Wylleman	2015	45	7. Pink, Saunders, and Stynes	2015	19
3. Larsen et al.	2013	41	8. Mateos, Torregrossa, and Cruz	2010	18
4. Henry	2013	37	9. Tshube and Feltz	2015	17
5. Stambulova and Alfermann	2009	36	10. Ryan	2015	13
Cluster 3 (TGCS = 130): Sports identity and DC in young student-athletes					
1. Harrison et al.	2011	34	6. Stambulova and Wylleman	2019	11
2. Sorkkila, Aunola, and Ryba	2017	16	7. Knight, Harwood, and Sellars	2018	10
3. Ryba et al.	2017	13	8. Ryan, Thorpe, and Pope	2017	9
4. De Brandt et al.	2017	12	9. Aunola et al.	2018	7
5. van Rens et al.	2016	11	10. Sorkkila et al.	2018	7
Cluster 4 (TGCS = 154): Benefits and barriers in the development of Dual Career					
1. Torregrossa et al.	2015	37	4. López de Subijana, Barriopedro, and Conde	2015	26
2. Brown et al.	2015	27	5. Petipas et al.	1992	24
3. Cosh and Tully	2015	26	6. Kuettel, Boyle, and Schmid	2017	14
Cluster 5 (TGCS = 174): Experiential perspective of the Dual Career					
1. Stambulova et al.	2015	67	4. Gledhill and Harwood	2015	28
2. Ryba et al.	2015	43	5. Franck, Stambulova, and Ivarsson	2018	7
3. Blodgett and Shinke	2015	29			

thematic areas of DC research are presented.

3.3.1. Cluster 1 (red) - Dual Careers in the european context and support policies

It includes 11 articles that pay special attention to the policy situation at the European level concerning DC, and how this option of combining a sports career with training or work is developed in this European context, and what aspects can influence this development. Of the five clusters, this is the second-largest number of citations received in the WoS Main Collection (TGCS = 262). It is characterized by the heterogeneity of methodologies used to achieve the objectives proposed in the different studies.

The most cited article in this thematic group is that of Aquilina (2013), with a total of 72 citations. In its study, Aquilina (2013) tries to explain, within European contexts, the successful development of DC by student-athletes. They were considering both the opportunities and the limitations they encounter to demonstrate that sport and academic careers are not only compatible but complementary.

The second most cited article (TGCS = 56) in this cluster is by Aquilina and Henry (2010). In this study, the authors analyze the different ways in which EU Member States have attempted to address the educational needs of elite sportspeople. The third most relevant article in this first cluster, with 28 citations, is Lupo et al. (2015). In this article, Lupo et al. (2015) investigate the Dual Career's motivations of European student-athletes living in countries that offer different educational services to elite athletes.

Finally, within this first group, the study by Baron-Thiene and Alfermann (2015) is presented, with a total of 26 citations. This study focuses primarily on the development of DC. It tries to identify the personal characteristics that predict dropout versus continuation among Dual Career athletes from different sports who attend sports schools (they provide an optimal environment to combine academic education with a sports career).

3.3.2. Cluster 2 (green) - holistic view of sports career development and transitions

In this second cluster, attention is focused on understanding the sports career from a holistic (global) approach. Not only the sports aspect matters but many other aspects of the athletes' life are important. It also analyses the transitions that occur within the sports career and, consequently, in student-athletes' lives. It is currently the most influential thematic group in DC research. Composed of a total of 10 articles, it has a total of 437 citations. In general, it is a group in which both theoretical and experimental studies stand out and where the qualitative methodology for data collection in the different studies predominates.

In the first place, being the article with the highest number of citations (TGCS = 183), we find the article by Stambulova et al. (2009). Theoretical in nature, through a review of the literature, this study aims to find out the historical trends and the state, at the time, of the subject of the evolution of the sports career and the transitions that take place in it. In the second place, with a TGCS of 45 citations, is the study by Debois et al. (2015). The authors of this article analyze, through in-depth interviews, how athletes whose sporting careers have been extended and successful perceive from a holistic perspective the career challenges and transitions, both at the sporting level and the psychological, psychosocial, and academic/vocational levels.

The third most cited article within this cluster is by Larsen et al. (2013), with 41 citations. In this study, the sports environment's

central role in the development of sports is highlighted, giving great importance to the analysis of athletes and their careers from a holistic approach. In fourth place is the work carried out by Henry (2013), who reviews the literature on athletes' rights and their career development from a European context perspective.

3.3.3. Cluster 3 (blue) - sports identity and perception of dual career in young student-athletes

The third cluster consists of a total of 10 articles and has a TGCS of 130 citations. It is, therefore, the thematic group with the lowest number of sources in the whole search. In this group, studies of an experimental nature stand out. Despite using qualitative methodologies, quantitative methods through validated questionnaires as a data collection instrument stands out.

Firstly, with a total of 34 citations, there is the study by Harrison et al. (2011), which focuses on determining the relationship between people's race and their athletic identity, in addition to examining the specific elements of the instrument used (AIMS, validated scale that measures Athletic Identity). to detect differences by race. The second most cited article (TGCS = 16) within this cluster is by Sorkkila et al. (2017). This study analyzes the profiles of athletes who follow a DC and who "burn out" about their expectations of success in sport and school.

Thirdly, the article by Ryba et al. (2017), with 13 citations. This study focuses on building different career styles in adolescents who undertake a DC. The study examines how and to what extent Finnish adolescent athletes narrate and integrate significant life events in sport and education into their future identities and narratives to delineate athletes' different career-building styles. Finally, highlight De Brandt et al. (2017) article with 12 citations. This study uses a validated questionnaire (DCCQ-A) to explore Flemish student-athletes' perceptions of the importance, ownership, and need to develop successful DC competencies.

3.3.4. Cluster 4 (yellow) - benefits and barriers in the development of dual career

The fourth cluster, which has a total of six articles and a total of 154 citations), focuses on the benefits of pursuing a DC in athletes' lives and shows the barriers and obstacles that athletes face to successfully pursue a dual career in academia and sport.

Firstly, with 37 citations, the article by Torregrossa et al. (2015) analyses sports withdrawals depending on the type of career that different Olympic-level athletes had followed. The study by Torregrossa et al. (2015) highlights various benefits concerning the withdrawal or retirement process achieved when developing the DC.

The second article that stands out in this cluster is the one of Brown et al. (2015), whose TGCS in 27 citations. This study is based on the transitions experienced by elite student-athletes at a British university where a DC support program has been established. Specifically, the study seeks to explore, in a holistic approach, the demands faced by student-athletes, the barriers that may inhibit their successful transitions, the sources they have available to address the needs, and the coping strategies adopted (Brown et al., 2015).

Thirdly, Cosh and Tully (2015) article is presented, which presents a total of 26 citations. This article, following the line of study of Brown et al. (2015), highlights the need for research that explores what stressors student-athletes encounter during the development of their dual pathways and what strategies they use to cope with them. Finally, although with the same number of citations as the previous study (TGCS = 26), the study by López de Subijana et al. (2015) stands out. In line with the rest of the articles in this cluster, the research focuses on the barriers which elite athletes encounter when studying, in this case in Spain, and an evaluation is also made of a career assistance program in this country, the *Programa de Apoyo al Deportista* (PROAD).

3.3.5. Cluster 5 (purple) - experiential perspective of the dual career

The last cluster identified focuses on explaining the different perspectives with which sportspeople face DC and the different pathways they can follow, through the experiences gathered in the studies that make up the thematic group. A total of five articles makes up the fifth cluster of DC research, with a cumulative total of 174 citations so far. Although there are various methodologies in each study's approaches, as expressed in the thematic group's title, most studies use the experiences collected through different methods, mostly qualitative.

The first article identified is that of Stambulova et al. (2015), which presents 67 citations. This study focuses on the transitions and adaptations of Swedish athletes to the national elite sports school. The aim of this study by Stambulova et al. (2015) is to examine the experiences of adolescent students and athletes in their DC (including sport, studies, and private life) during their first year at national elite sport schools, with a particular focus on the development of their athletic and student identities.

The second article in this thematic block, with 43 citations, is that of Ryba et al. (2015). This study focuses on the different DC paths followed by transnational athletes, emphasizing the transition to higher education. Considering transnationalism (part of globalisation processes) as a lifestyle and career-transformer for athletes, the study aims to map the kinds of paths participants take as they begin to organise their life choices within a broader transnational field. Thirdly, there is an article by Blodgett and Schinke (2015), which presents a total of 29 citations. The study is based on research on sports career development and transitions, which centralizes the culture's constitutive role in athletes' experiences.

Closing the last of the clusters identified in this research, Gledhill and Harwood (2015) article stand out with a total of 28 citations. In line with the rest of the articles in this cluster, through the experiences, a negative case analysis, the study focuses on analyzing the transition from junior to senior and the DC of young English football players. From a holistic perspective, the authors conduct such an analysis to develop an informed theory of the factors contributing to career and talent development and transitions in UK women's youth football.

In the present study, with the use of a methodology that had not yet been applied in this area, different results and conclusions have been obtained that lead to future indications for research on the reality of DC. Despite the difference in methodology and approach of this research with the two previous studies conducted by Guidotti et al. (2015) and Stambulova and Wylleman (2019), some of the results obtained in these reviews of the literature on DC can be extracted and related. Specifically, the three studies determine that the

growth in scientific publication on DC in the last decade stems from the growing interest in the improvement of this reality, especially in the European context. Another point that the findings of the studies in question have in common is the methodological diversity of the research and the need to develop instruments to assess the different aspects and dimensions of DC. Another aspect to highlight, which is shared by all three studies, is that most of the research focuses on the combination of sport and studies, leaving the field of work in the background, with education playing a fundamental role in the development of these DCs for the subsequent successful professional development of student-athletes. Nevertheless, it is true that Stambulova and Wylleman (2019) consider a future line of research to develop an agenda for research on DC in sport and work (e.g., athletes' employability challenges) and link it to DC in sport and education research. Finally, among the results obtained and future research directions drawn from the previous reviews, we can confirm the need to research DC from a holistic approach in which all the dimensions that revolve around the student-athlete in question are considered. Furthermore, is needed to analyze this situation from the most basic educational levels for a sustainable development of this reality, optimising development at both educational and sporting levels, as commented by Stambulova and Wylleman (2019), for a subsequent transfer to professional competences.

4. Conclusions

The knowledge of the current state of his research field allows us to establish future directions for its development. The results of this study show that DC research has now moved beyond the embryonic stage. However, it is a relatively new topic, as demonstrated by the growing number of publications and their consolidation in recent years. It is now at the halfway point, on a continuously opening path up new frontiers and perspectives with a growing interest and involvement of different sectors (sport, psychology, sociology, government institutions, educational institutions, etc.).

Through the methodology used in this research, which has not been used in any study of the subject so far, the authors, journals, countries, and institutions that are most productive in DC research have been identified. Thus, European context is the most productive in terms of DC literature, with authors from the Nordic countries as well as Spain and Italy standing out. Following a review of the literature, it has been observed that it is in these Nordic countries where, to the greatest extent, support programmes for the successful development of DC in student-athletes are being developed and analysed, both at secondary and higher education levels. Also, the main co-authoring networks and keyword networks have also been revealed, giving a broader view of this study field and providing useful information for further research. After analysing these obtained results, it has been possible to draw meaningful conclusions that determine DC research's current state and establish future directions for its research. In this way, one of the main findings is that developing more educational and sport policies is essential to ensure the proper development of student athletes' DC.

Concerning the future directions for the development of this field of study, the following lines should be highlighted in Table 6:

As mentioned in the discussion of the results and related to those previous reviews of the literature in the topic, one of the main directions that has to be specially considered because of its importance in the developmental process of the student-athlete is the educational domain. In this way, from the future directions in previous summary (Table 6), it is important to highlight those that refers to this domain: (1) carry out international comparative studies to provide valuable information to multi-sectoral bodies (governments, sports institutions, educational bodies) in the management of sport and education for future European citizens, to make it easier for athletes to combine sports training with study or work; (2) examine the development of the trajectories of sports and academic burnout

Table 6
Future directions in the DC research according to resulting clusters.

Cluster	Future research directions
Red (1)	Research and development, in the European context, learning materials to develop programs adapted to athletes. Work on developing valid and reliable measurement instruments to assess and monitor student-athletes' motivations towards DC in international contexts. Carry out international comparative studies to provide valuable information to multi-sectoral bodies (governments, sports institutions, educational bodies) in the management of sport and education for future European citizens, to make it easier for athletes to combine sports training with study or work. Compare athletes from different backgrounds to analyze environmental influences on sports careers and investigate the combined impact of athletes' psychological characteristics and social determinants on the development of DC.
Green (2)	Analyze, through longitudinal designs, the different categories of transitions experienced by elite athletes and compare the skills and support received from athletes who manage to overcome them against those who show more significant difficulties or negative experiences. Study how elite female athletes can reconcile their psychological, psychosocial, and academic/vocational development with their sporting development in long-term sports careers.
Blue (3)	Examine the development of the trajectories of sports and academic burnout throughout the formative years. Complement the individual approach to DC competencies with a developmental, holistic, situational, and contextual perspective so that tailored and targeted interventions can be further developed for student-athletes.
Yellow (4)	Analyze and compare student-athletes' experiences at different universities offering DC support programs in Europe, North America, and the rest of the world. Examine the barriers that elite athletes face when studying in different countries, so that different contexts can be analysed. Investigate the usefulness and effectiveness of existing sports support programs in terms of time management skills, autonomy and accountability of athletes, and the benefits of this support to the DC's development.
Purple (5)	Address how multiple and interconnected transitions take place in specific contexts. Use various interpretative and ideographic research approaches intertwined with practice to produce culturally sensitive accounts of athletes' career development and transitions.

Source: own elaboration based on the articles reviewed

throughout the formative years; (3) analyze and compare student-athletes' experiences at different universities offering DC support programs in Europe, North America, and the rest of the world; and (4) examine the barriers that elite athletes face when studying in different countries, so that different contexts can be analysed.

4.1. Limitations and future research proposals

In this study, several limitations need to be mentioned. The data have only been obtained from the WoS, so it is essential to consider other databases that may have resulted in a loss of documents. The search equation was also limited to official papers and reviews, with other documents excluded from the search. Therefore, in future studies, it is recommended to perform the search string in other databases, such as Scopus or Google Scholar. These databases will allow a broader search to be obtained that includes a greater number of documents and including other types of documents apart from official papers and reviews to avoid loss of information.

Another of the study's limitations, as in all studies of this type, lies in the elaboration of the search equation, carried out through the equations of the previous reviews and the inclusion of new terms in the author's opinion. This fact is due to the recent standardization of using the concept "Dual Career" (2007), which makes it possible that previous literature uses other terms or formulas; and refers to some of the aspects studied about the reality of DC. In this sense, another of the limitations that can be highlighted in the research is that a lower number of studies have been found in non-European context, like North America, despite the fact that these are countries where programmes for combining sport and academic careers are in place. This lack of documents related to DC in this context may be due to the fact that other terms are used to refer to the topic, and it is recommended that this difference in terminology be considered for future research and included in order to broaden the search. Therefore, it is recommended that more consistent search equations be developed as a future line of work, addressing the full spectrum of DC literature. To this end, this paper provides the leading networks of keywords used in DC research through which such an equation can be constructed.

Declaration of competing interest

The authors declare no conflict of interest.

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CRediT authorship contribution statement

Alberto Vidal-Vilaplana: Conceptualization, Data curation, Formal analysis, Writing – original draft. **Irena Valantine:** Project administration, Resources, Writing – review & editing. **Inga Staskeviciute-Butiene:** Project administration, Resources, Writing – review & editing. **Maria H. González-Serrano:** Methodology, Data curation, Software, Visualization. **Laura Capranica:** Methodology, Writing – review & editing. **Ferran Calabuig:** Formal analysis, Supervision, Visualization.

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