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Collaboration in the Supervision of Doctoral Theses in Education in Spain

La colaboración en la dirección de tesis doctorales en Educación en España

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Abstract

The demands of internationalisation in doctoral programmes, the call for more interdisciplinary thesis supervision, and the need to improve the quality of doctoral theses have led to an increase in co-supervision of theses. This research seeks to understand the nature and characteristics of collaboration in the supervision of outstanding doctoral theses in the field of education. To this end, a descriptive univariate and bivariate bibliometric analysis was carried out on theses in education defended in Spain between 2018 and 2021 that received special awards, considering aspects such as the nature of the collaboration, as well as the experience and impact of the supervisory teams. The results indicate that 61.2% of the award-winning theses were supervised by two or, in exceptional cases, three people. Collaboration between teachers from the same university and area of knowledge predominates, with a marked difference in thesis supervision experience and academic impact, with interdisciplinary, inter-university and international co-supervision being less frequent. In addition, there is notable experience in thesis

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supervision and a high academic impact in at least one of the supervisors of the award-winning theses. In conclusion, there is a clear need to continue strengthening co-supervision, especially that which promotes interdisciplinary, inter-university and international collaboration. Likewise, in order to improve the quality of theses, it is suggested that supervision by experienced teachers with established research careers be encouraged, collaborating with more novice teachers as a way of learning the responsibilities of thesis supervision.

Keywords: doctoral theses; thesis supervision; education; bibliometrics

Resumen

Las exigencias de internacionalización de los programas de doctorado, la demanda de una dirección de tesis más interdisciplinar y la necesidad de elevar la calidad de las tesis doctorales han generado el crecimiento de las codirecciones de tesis. Esta investigación busca conocer la naturaleza y características de la colaboración en la dirección de tesis doctorales destacadas en el ámbito de la Educación. Para ello, se realizó un análisis bibliométrico descriptivo univariado y bivariado de las tesis en Educación defendidas en España entre 2018 y 2021 que obtuvieron premio extraordinario, considerando aspectos como la naturaleza de la colaboración, así como la experiencia e impacto de los equipos de dirección. Los resultados indican que el 61,2% de las tesis premiadas fueron dirigidas por dos o, en casos excepcionales, tres personas. Predomina la colaboración entre docentes de la misma universidad y área de conocimiento, y con una marcada diferencia en experiencia en la dirección de tesis e impacto académico, siendo las codirecciones interdisciplinarias, interuniversitarias e internacionales menos frecuentes. Además, se observa una notable experiencia en dirección de tesis y un alto impacto académico en al menos uno de los directores de las tesis premiadas. En conclusión, se destaca la necesidad de seguir reforzando las codirecciones, especialmente aquellas que promuevan la colaboración interdisciplinaria, interuniversitaria e internacional. Asimismo, para mejorar la calidad de las tesis, se sugiere favorecer la dirección por parte de docentes experimentados y con investigación consolidada, colaborando con otros más noveles como forma de aprendizaje en las responsabilidades de supervisión de tesis.

Palabras clave: tesis doctorales; dirección de tesis; educación; bibliometría

Introduction

There is a clear upward trend worldwide in the number of doctoral theses in which two or more lecturers collaborate in their supervision (e.g., Hansson and Schmidt, 2023; Kumar and Wald, 2022). At the end of the last century, Pole (1998) analysed the recommendations of the influential *Harris Report* (Harris, 1996), which suggested an increase in collaborative theses, and found that this type of doctoral supervision is still rare in the social sciences. Today, collaborative supervision—or co-supervision, shared supervision, or joint supervision—has become common practice in all scientific disciplines (Wald et al., 2022).

The reason for this growth is probably that it offers undeniable benefits for doctoral students, thesis supervisors and their respective institutions; however, it must also be acknowledged that it has some drawbacks, to which must be added the existence of certain institutional factors that affect its development.

Advantages and disadvantages of co-supervision

Min Zou and Delin Kong (2019), based on the question "Is co-supervision a blessing or a curse?" (p. 48), analyse the advantages and disadvantages of co-supervision for doctoral students. Among the former, they highlight that this modality allows them to benefit from a greater diversity of knowledge and experiences, which translates into more interdisciplinary training and access to a wider variety of research approaches and methods. In addition, it provides them with other perspectives, making discussions with their supervisors more enriching. Another interesting advantage is that it reduces the chances of the doctoral student becoming "orphaned" – in the terminology of Wisker and Robinson (2012) – if the supervisor has to leave the supervision or if the relationship deteriorates (Wald et al., 2022). Co-supervision also provides access to a wider professional network, which can be decisive for entering the academic world. Finally, Zou and Kong (2019) emphasise that co-supervision improves candidates' cooperative skills, encouraging them to experiment with different interpersonal styles, supervisory approaches and ways of approaching research.

Co-supervision also has advantages for those who supervise theses. It provides additional stimulation through collaboration with other colleagues (Kálmán et al., 2022), promotes the improvement of one's own supervisory skills (Pyhältö et al., 2023) and contributes to professional development (Spooner-Lane et al., 2007). Furthermore, it allows for a more equitable workload between co-supervisors, who share both tasks and responsibility (Ives et al., 2022). Finally, it should not be forgotten that co-supervision encourages greater academic publication and facilitates the subsequent development of joint publications (Ives et al., 2022).

However, as Zou and Kong (2019) also point out, co-supervision can be perceived as "torture" due to the challenges it poses. Among these, they mention the possibility of disagreements over different aspects of the development of the thesis and the doctoral student's work, the receipt of contradictory comments and guidelines, a lack of clarity in the distribution of roles between supervisors and, in some cases, competition between them. This drawback may be one more on the list for those who fail to complete their thesis. A study by Fuentes and Arguimbau (2010), which conducted a bibliometric analysis of 75,795 theses read and approved during the decade 1997-2007 in Spain in all areas of knowledge, found that only 10% of doctoral students will be able to complete their thesis.

Teachers also find co-supervision challenging, as it involves some significant hurdles. It requires more time to plan how to distribute the work and discuss the research (Wald et al., 2022). In addition, there is often unfair recognition of the work of the second

supervisor, either because their work is not always valued or because they take credit that does not belong to them due to their limited involvement (Grossman and Crowther, 2015; Spooner-Lane et al., 2007). In this regard, Elega (2023) – through semi-structured interviews with 15 doctoral students – identified five ethical dilemmas that students face during their research training: lack of freedom to make decisions, incompetence, lack of confidence, abuse of power, and lack of rules for authorship, with students reporting that they have been pressured to include the name of one of their supervisors even when there has been a lack of involvement.

Other significant challenges faced by teachers relate to a lack of clarity in roles and responsibilities (), a lack of leadership in supervisory activities (Kálmán et al., 2022; Spooner-Lane et al., 2007), unclear relationships in the interests of harmony, interpersonal differences related to power differences, and a lack of a broad academic vision of the overall research design (Wald et al., 2022). Finally, perhaps the most significant challenge is the potential for tension between colleagues (Kumar and Wald, 2022) arising from challenges, contradictions (Watts, 2010), confrontations (Kobayashi et al., 2015) or a lack of communication between them (Wald et al., 2022).

Institutional factors that have an impact

Beyond these advantages and limitations for doctoral students and supervisors, there are institutional factors that exert pressure in favour of co-supervision. Kálmán et al. (2022) point to four: the internationalisation of universities and doctoral studies, greater interdisciplinarity and intersectoral collaboration, and improved quality of supervision.

Firstly, the growing internationalisation of doctoral studies is driving collaboration in thesis supervision between academics from universities in different countries (Watts, 2010). This occurs both through international co-supervision agreements and through research stays and international training programmes.

In addition, the strong worldwide trend towards promoting interdisciplinary research is forcing the existence of supervisors from different disciplinary fields (Watts, 2010). Indeed, when research goes beyond the boundaries of a specific field or requires broader knowledge of research topics or approaches, as well as knowledge, skills and experience in more than one area of research, collaboration between lecturers is a must, which is encouraging co-supervision.

Finally, there is a demand for improved thesis quality, which requires improved supervision quality. This is evident in the increase in requirements for thesis supervision. Co-supervision reduces the risk of placing all the responsibility on a single person, providing a 'safety net' of continuous supervision and expert advice on specialised content or other knowledge (Grossman and Crowther, 2015). It is also linked to promoting the training of new supervisors, working side by side with more experienced colleagues (Almlöv and Grubbström, 2023).

Lines of research on supervisor collaboration

Research on collaboration in doctoral thesis supervision is still limited (Almlöv and Grubbström, 2023; Pyhältö et al., 2023), and most of the existing studies are recent, published in the last 25 years. After analysing this literature, it is possible to group the studies into five main themes:

1. *Benefits, difficulties and challenges of co-supervision.* This theme includes studies that address the advantages, complications and challenges inherent in this supervision model. Notable works include those by Hansson and Schmidt (2023), Pyhältö et al. (2023), Watts (2010) and Wisker and Robinson (2012).
2. *Institutional factors influencing co-supervision.* This group analyses elements such as interdisciplinarity, internationalisation and quality improvement policies, already explored in studies such as those by Kálmán et al. (2022).
3. *Personal factors affecting co-supervision.* Previous supervisory experience, the degree of independence of the doctoral student, specific training for supervisors, academic capital, as well as structures, agency and individual expectations (Wilkin et al., 2022) are some of the most prominent aspects. In addition, issues such as gender (Villarroya et al., 2008) and academic collaboration (Ives et al., 2022) are also considered determinants.
4. *Leadership styles in collaboration.* This includes research on the roles of co-supervisors (Duarte-Martínez et al., 2022), hierarchy and responsibility in project management (Kumar and Wald, 2022), power relations (Wald et al., 2022) and the structure of the leadership team.
5. *Effectiveness of co-supervision.* Although less explored, this category focuses on evaluating the effectiveness of co-supervision in terms of results and academic quality, as highlighted by Grossman and Crowther (2015).

Despite the relevance of co-supervision in doctoral training and its implications for both students and institutions, there is a notable lack of literature on aspects such as the composition of supervision teams, their hierarchical structure and the impact on the doctoral student's training experience. And research in Spain is practically non-existent.

Spanish context on collaboration in thesis supervision

In Spain, collaboration in thesis supervision is established by Royal Decree 99/2011 of 28 January, which regulates official doctoral programmes. Article 12.1 states:

The thesis may be co-supervised by other doctoral supervisors [...] when there are academic or interdisciplinary reasons for doing so, or in the case of programmes developed in national or international collaboration [...] In no case shall the number of supervisors exceed three.

These other doctors must meet the same requirements as the supervisors, who, in addition to being doctors, must have accredited research experience. However, it is also stated that co-supervision of the thesis by doctors who do not meet these requirements may be authorised. The Royal Decree also states that the number of supervisors may not exceed three.

Universities, in their various regulations, do not usually add new elements to the provisions of the Royal Decree. However, there are some additional details, always referring to the third supervisor. For example, at the universities of La Rioja and Murcia, there are restrictions on the affiliation of supervisors, as only two of them may belong to the same university. In addition, some universities, such as Zaragoza, require that all three belong to different disciplines. At the universities of A Coruña², Oviedo³ and La Laguna⁴, a third co-supervisor is only allowed in cases of joint supervision with other universities. In any case, it is usually stated that a third co-supervisor is exceptional and must be duly justified.

All of this is the regulation, but there is no data on how it is being implemented. Indeed, in Spain we have research related to the development of doctoral theses, for example, the classic work by Fuentes and Arguimbau (2010), which analyses the production and dissemination of doctoral theses in Spanish universities in the period 1997-2007, or the study by Fernández-Cano et al. (2012), which analyses the time series of Spanish theses from 1848 to 2009. There is also research on doctoral theses in specific areas of study, for example, on sports biomechanics (Campos et al., 2022), philology (Gargallo and Alexopoulou, 2021), business management (Segarra-Saavedra et al., 2021), or the recent study by Sanchidrián et al. (2021), which analyses the 198 doctoral theses defended at Spanish universities between 1990 and 2015 with the descriptor "History of education" in the TESEO database of the Ministry of Education, Culture and Sport. However, in no case is the issue of collaboration in the supervision of doctoral theses addressed.

Thus, the objective of this research is to analyse and describe the characteristics of collaboration in the supervision of doctoral theses in the field of education in Spain, focusing specifically on those that have received special awards.

Method

This study takes a quantitative approach with a descriptive and retrospective design, focusing on bibliometric and documentary analysis. This method was selected for its suitability in objectively characterising doctoral theses and the patterns of the people who write and supervise them (de Bellis, 2014). The design is based on bibliometrics, a branch

² https://sede.udc.gal/services/electronic_board/EXP2024/006398/document?logicalId=739dee78-adb1-4133-b9c6-953c329b350&documentCsv=HTDERNV006IFOPQT39DB234L

³ <https://cei.uniovi.es/postgrado/doctorado/normativadoctorado>

⁴ <https://www.ull.es/doctorados/desarrollo-regional/organizacion-del-programa/supervision-tesis/>

of scientometrics that applies mathematical and statistical methods to the study of scientific communication (Ellegaard, 2018).

Specifically, we analysed the individuals who supervised any of the 85 doctoral theses in Education defended at Spanish public universities that received special awards and were defended between 2018 and 2021 available at the time of data collection (spring 2023). Thus, theses from universities that do not make award-winning theses available in open access or those that did not respond to the research team's request to provide them are not included.

In total, the sample consisted of 85 doctoral theses (Annex 1), which were supervised by 140 lecturers. The characteristics of these theses are as follows:

1. 55.5% received international recognition.
2. 83.5% were presented in the form of a monograph thesis, and the remaining 16.5% as a thesis comprising a compendium of publications.
3. 85.9% were written primarily in Spanish, 5.9% in English and 8.2% in Catalan.
4. There are theses from the following universities: Alcalá, Autonomous University of Barcelona, Autonomous University of Madrid, Complutense University of Madrid, A Coruña, Alicante, Almería, Extremadura, Girona, Granada, La Laguna, La Rioja, Lleida, Málaga, Murcia, Oviedo, Salamanca, Santiago de Compostela, Seville, Valladolid, Vigo, Zaragoza, Basque Country, UNED and Valencia.
5. There are theses from all areas of education. Most are in Didactics and School Organisation (40.0%), Research Methods and Diagnosis in Education, and Theory and History of Education (both with 11.8%); the number of theses in each of the other areas is less than 8.0% of the total.

The variables analysed are as follows:

- Related to the thesis:
 - Existence of collaboration, measured by the number of thesis supervisors.
 - Area of knowledge in which it is registered.
 - Thesis type: monograph or compendium of publications.
 - With or without international mention.
- Variables of the supervisor:
 - University affiliation.
 - Disciplinary field and area of knowledge.
 - Experience in thesis supervision, measured by two variables:
 - Number of previous theses supervised.
 - Academic age of the supervisor: years since defending their thesis.

- Academic impact, through:
 - Number of citations received, according to Dialnet Métricas⁵.
 - *H* index (Hirsch, 2005), according to Dialnet Métricas.
- Gender.
- Variables of the person writing the thesis:
 - Gender.

The documentary sources used are as follows. Firstly, the primary information on the details of the thesis (type, special award) and supervision (number and affiliation of supervisors) was extracted directly from the thesis reports and official university records. Dialnet and Dialnet Metrics were consulted to collect secondary information on the scientific productivity of the thesis supervisors.

The data collection tool was a structured Coding Protocol and Data Collection Form, designed specifically for this study and entered into a data matrix on the Microsoft Excel platform. This protocol operationally defined the bibliometric and documentary variables, ensuring standardisation and consistency in the information extraction process. Thus, the collection form was organised in a matrix, where each row represented a unit of analysis (awarded doctoral thesis) and each column corresponded to a variable. To ensure the consistency of the coding protocol, the three co-authors of this article independently collected the data by completing the form. Given the objective characteristics of the information, there was almost total agreement on all the information collected. In the few cases where there was a discrepancy, the original source was reviewed, and in all cases, minor transcription errors were corrected.

The fieldwork was carried out between February and May 2023. The procedure was as follows. First, information was sought at each university on the theses in Education that received special awards between 2018 and 2021. Once the list of award-winning theses had been identified, the full text of each one was searched for, either in the universities' own repositories, Dialnet or Teseo. To mitigate the lack of information in cases where the text of the doctoral thesis was not available or access to it was restricted, an express request was made to the different doctoral schools to request the document or to request the publication of the latest resolutions of award-winning theses. Only some universities provided the missing information. Theses that were not available in full text were not considered.

The data in Excel was then transferred to SPSS v31 to perform the relevant calculations. In line with the research objective, the analyses performed were descriptive, both univariate and bivariate.

⁵ <https://dialnet.unirioja.es/metricas/>

Results

The research findings are presented in four sections. First, an overview of the collaboration between supervisors is provided, analysing both its frequency and nature. Next, in the second and third sections, collaboration is examined according to the experience of those who co-supervise and its academic impact. Finally, collaboration in supervision between people of different genders is explored.

Nature of collaboration

The most common situation in doctoral theses with special honours in Education is co-supervision. Indeed, 61.2% of theses have two or more supervisors. More specifically (Table 1), 57.7% have two and 3.5% have three supervisors. Thus, 140 people supervise, alone or with other colleagues, the 85 award-winning theses: 33 of them do so alone and the remaining 107 in collaboration.

It is particularly striking that this situation is even more extreme when theses are presented in the form of a compendium of publications and when they receive international recognition. In the first case, only 14.3% have a single supervisor, and in the second, 25.5%.

Table 1

Distribution of Spanish theses in Education with special awards according to the number of supervisors

No. of supervisors	Total	Format		International mention	
		% in monograph	% per compendium	% with mention	% without mention
1 director	38.82	43.66	14.29	25.53	55.30
2 directors	57.65	54.90	78.57	70.21	42.10
3 directors	3.53	1.40	7.14	4.26	2.60

It is particularly important to determine the nature of the collaboration. The results indicate that:

1. International collaboration is rare, occurring in only three theses with special awards. Of these, one case is an international co-supervision between two universities, a Spanish university and a Portuguese university, the University of Porto. The other two collaborations occur in theses in which a foreign lecturer – in one case from the University of Iceland and in the other from the University of Macerata (Italy) – supervises the thesis with one or more Spanish supervisors.
2. National collaboration, i.e. between supervisors from different universities, occurs in 25.0% of cases where there are two or more supervisors. In one case, there are three supervisors, one of whom is from a different university. It is also

interesting to note that this collaboration is more regional than national, given that in 58.3% of theses with two co-supervisors from different Spanish universities, they are from the same region, particularly Catalonia and Madrid.

3. Collaboration between teachers from fields of knowledge outside Education occurs in 19% of theses with co-supervision. Thus, collaboration with teachers from Anthropology, Computer Science and Artificial Intelligence, Telematics Engineering and Psychology, to give a few examples, can be observed.
4. Collaboration between Education lecturers from different fields of knowledge occurs in 32.3% of cases where there is co-supervision.
5. Finally, the most common collaboration is between teachers from the same area, which occurs in 53.2% of cases where there are two supervisors.

A more in-depth view can be obtained by analysing collaboration according to the area of knowledge of the first person listed as supervisor (hereinafter supervisor) and the area of the second person (hereinafter co-supervisor). As can be seen in Table 2, collaboration is particularly significant in theses whose supervisor is affiliated with the field of Developmental and Educational Psychology: in all cases there is collaboration, especially with other areas of psychology. In the other areas, collaboration varies between 66.6% in theses on Physical Education and Sports and Didactics of Body Expression, and 50% in theses on Theory and History of Education. In the latter case, moreover, collaboration only takes place with other teachers from the same area. In theses whose supervisor comes from one of the Specific Didactics areas, collaboration occurs in 61.1% of cases, both with teachers from outside the field of Education and from the area of Research and Diagnostic Methods in Education (MIDE). In theses in the area of Didactics and School Organisation, there is 55.9% collaboration and, except for the areas of Physical Education and Sports and Didactics of Body Expression, there is collaboration with all areas, especially with Specific Didactics. Finally, in theses whose supervisor is from MIDE, collaboration occurs with other Didactics and with other disciplinary areas outside Education, as well as with teachers also from MIDE.

Table 2

Distribution of Spanish theses in Education with special awards according to the areas of knowledge of the collaboration

Area of knowledge of the supervisor	Single supervisor	Area of knowledge of the co-supervisor						Other non-educationa l
		1	2	3	4	5	6	
1. Physical Education and Sports and Physical	33.3	16.7	16.7	16.7				16.7

Education							
Teaching							
2. Specific teaching methods	38.9	33.3%	22.2				33.3
3. Teaching and school organisation	44.1	14.7	17.6%	8.8%	5.9	2.9	5.9
4. MIDE	40.0	20.0	20.0				20.0
5.							
Developmental and Educational Psychology						20.0	80.0
6. Theory and History of Education	50.0					50.0	

Notes. *In one thesis, there is collaboration between two specific areas of teaching: Teaching Musical Expression and Teaching Social Sciences.

Finally, there is greater collaboration in theses based on a compendium of publications than in traditional monograph theses. Thus, the vast majority of these theses are written by two or more people, 85.7% of them. Collaboration between teachers from different universities (33.3%) and between teachers from different areas (54.5%) is also higher. However, there is no collaboration with teachers from other fields.

Collaboration according to experience in thesis supervision

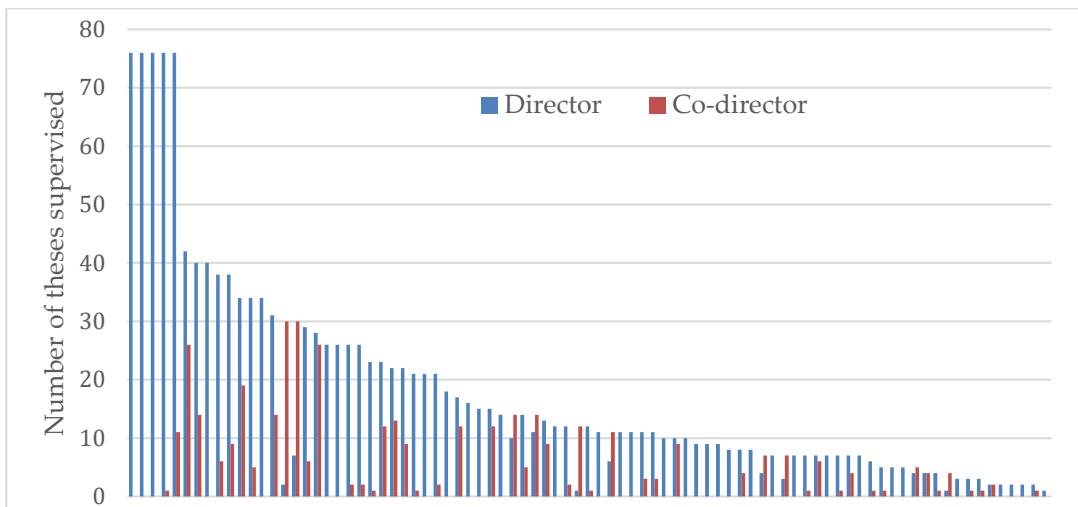
In general, theses with special awards are supervised by individuals with extensive experience in thesis supervision. Thus, if we take the maximum number of theses supervised by the individuals involved in the supervision, we find that the average is 18.3 theses. In cases of collaboration in supervision, in most theses the supervisor has more experience than the co-supervisor. This is the case in 73.1% of cases, and in 3.8% both supervisors have supervised the same theses. When collaboration occurs, the average number of theses supervised by the supervisor is 17.6 and by the co-supervisor is 7.7. However, as can be inferred from Figure 1, it appears that senior supervisors (those who have supervised more than 70 theses) are more reluctant to collaborate with another person as co-supervisor.

Nevertheless, as can be seen in Figure 1, collaboration between teachers with different levels of experience in supervising theses is very common. Thus, in 60.8% of theses, the number of theses supervised by one of the two people is more than double that of the other person, in the vast majority of cases the supervisor. In fact, 28.8% of theses

are the first supervision for one of the two supervisors (usually the co-supervisor), and in 9.6% of cases it is the second.

Figure 1

Experience in thesis supervision by the supervisor and co-supervisor of doctoral theses in Education with special distinction



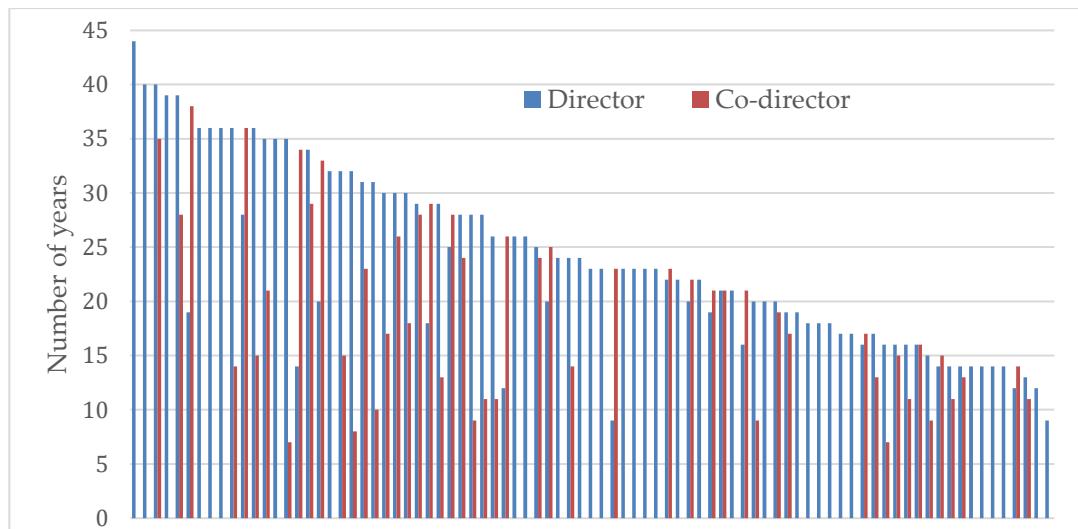
Focusing on compendium theses, the maximum average experience is 14.5 theses, and in the case of collaboration, the average number of theses supervised by the supervisor is 13.3 and by the co-supervisor is 5.8. In other words, the experience in supervising theses in the form of a compendium of publications is substantially lower than in the form of a monograph, probably because the compendium format is a more recent addition to doctoral programmes.

A different perspective is obtained if we analyse the **academic age** of supervisors and co-supervisors, i.e. the number of years since they obtained their doctorate. Both indicators show different realities; in fact, the correlation between them, for the 140 teachers analysed, is only 0.45. To illustrate this fact, there is a supervisor with 40 years of academic age who has supervised six theses in those years, and another with 16 years of academic age who, at the time of data collection, had supervised 38 theses.

In this case, taking again the maximum age of either director, the average is 24.8 years. For this variable, it is also common for the academic age of the director to be higher than that of the co-director. This is the case in 63.5% of cases, and in 3.8% of cases they are the same. Thus, in cases where there is collaboration, the average academic age of the director is 23.5 years and that of the co-director is 19.4 years.

Figure 2

Academic age of supervisors and co-supervisors of doctoral theses in Education with special distinction



Note: Academic age is understood to be the number of years since the doctoral degree was obtained.

Once again, the graphic representation of all the theses analysed (Figure 2) is very interesting. In contrast to what was observed with regard to the number of theses supervised, there is no significant difference in the number of years that have elapsed since the supervisors and co-supervisors completed their doctorates. In fact, in only 25.0% of cases does the supervisor have twice as many years or more as a doctor, while in 8.0% of cases, it is the co-supervisor who has more than twice as many years. Thus, in 68.0% of theses, the difference between the two is less than twice as many years. It should be noted that, for the variable number of theses supervised, this latter figure was only 39.2%.

Interestingly, for this indicator, there is hardly any difference between the age of thesis supervisors for compendiums and that of monograph theses, both close to 25 years of academic age (25.3 and 24.8, respectively).

Collaboration according to the academic impact of supervisors

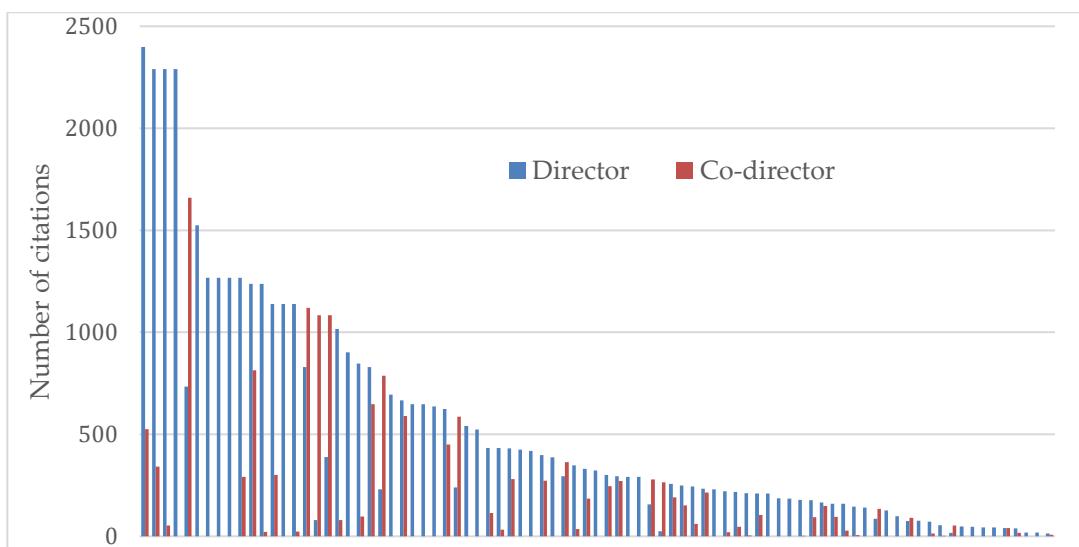
A third way of looking at collaboration in thesis supervision and its characteristics in theses with special awards in Education is to analyse collaboration in the supervision of award-winning theses, focusing on the academic impact of the supervisors. This is obtained using two variables: on the one hand, citations received and, on the other, the *H*-index, both variables obtained from the multidisciplinary database Dialnet Métricas. Experience in supervision and academic impact are two clearly differentiated aspects of,

especially academic age, whose correlation with both citations received and the *H-index* is around 0.20.

The average maximum number of citations for the team supervising the award-winning theses is 558.3 according to Dialnet Métricas, with the average maximum number of citations for the supervisor being 507.1 and 277.3 for the co-supervisor. For theses in monograph format, the figures are 541.1 maximum citations, 490.6 citations for the supervisor and 276.6 for the co-supervisor, and higher for compendium theses, with 645.3, 590.7 and 283.3 citations, respectively. In other words, as was the case with the number of theses supervised, it is common for supervisors to have substantially more impact than co-supervisors. In fact, this is the case in 74.5% of collaborative theses (Figure 3). It is also relevant that the most cited supervisors (with more than 2,000 citations) do not usually share the supervision of the thesis with a co-supervisor.

Figure 3

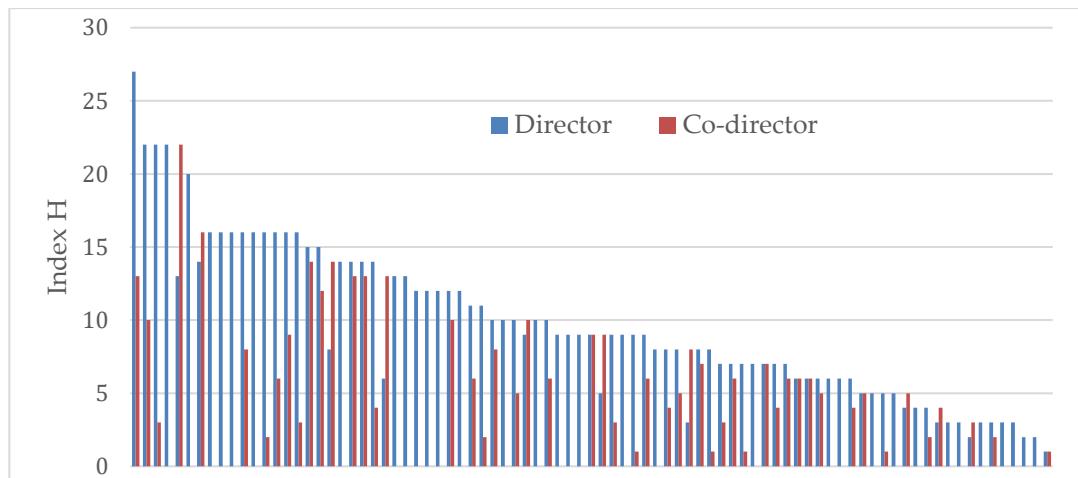
Number of citations of the academic output of the supervisor and co-supervisor of doctoral theses in Education with special distinction



A new perspective on the impact of supervisors is to see whether those with a higher *H-index* are more likely to sign as supervisors or co-supervisors (Figure 4). The analysis shows that the impact of the supervisor is greater than that of the co-supervisor. In cases where there are two supervisors, 68.0% of theses have two supervisors, in 12.0% the impact is identical, and in the remaining 20.0% the co-supervisor has more citations. Thus, the average impact when there is only one supervisor is 9.4; if there are two supervisors, the average impact of the supervisor is 9.8 and that of the co-supervisor is 6.7.

Figure 4

H index: academic output of the director and co-director of doctoral theses in Education with special distinction



The use of Dialnet Metrics makes it possible to put the number of citations of the teams of directors into context with that of the total number of researchers in Spain, all of them in the field of education. Thus, a superficial analysis of this multidisciplinary database in the field of education would lead to the conclusion that the impact of the director does not affect whether or not a thesis wins an award, given that there are a similar number of theses with low, medium and high impact. However, a more detailed analysis indicates that this is not the case. Indeed, if an *h*-index of five or less is considered low impact, it is found that, in Spain, at the time of data collection, there are 4,839 researchers in the field of education in this group, and only 19 theses whose supervisor is in this range. This means that the percentage of potential supervisors with award-winning theses is 0.4%.

Secondly, if we analyse supervisors with an average impact, with an *h* between six and ten, we find that there are 34 theses. If we take into account that, according to Dialnet Métricas, there are 1,095 education researchers in Spain with this impact, the probability is 3.1%. Finally, if we take the highest impact interval (with an *H*-index greater than ten according to Dialnet Métricas), we see that there are 279 researchers in Spain with this index and the number of theses with a supervisor in this interval is 31. Thus, the probability of obtaining an award with a supervisor of high academic impact is 11.1%. Therefore, a clear conclusion can be drawn: the greater the academic impact of the supervisor, the greater the probability that the thesis will receive an extraordinary award.

Collaboration between supervisors

Finally, it is possible to approach the analysis of collaboration in thesis supervision by studying the gender of the people involved. It was previously noted that the total number of people involved in the supervision of the award-winning theses analysed is 140. Of these, 57 are women, which means that 40.7% of the supervisors or co-supervisors of the theses with special awards are women. If this figure is compared with the percentage of female university lecturers in the field of education, their under-representation becomes even more apparent. Indeed, 4,590 of the 8,450 people who teach education at public universities are women, representing 54.3%, 13.6 points more than those who supervise award-winning theses.

Breaking down these figures according to collaboration (Table 5), we find, first of all, that in most theses where there is no collaboration, the people who act as thesis supervisors are men (60.6%). If there are two collaborators, the least common situation – in 18.4% of cases – is that both supervisors are women, in 36.7% of cases both are men, and in the remaining 44.9% there is one woman and one man. In these cases, in just over half (54.5%) the supervisor is a woman and the co-supervisor is a man. Finally, in the three theses in which there is co-supervision between three people, in one thesis there is collaboration between two men and one woman and in the other two between two women and one man. In two of these three cases, the supervisor is a man and in the last one, a woman.

Thus, the gender of the professors who supervise the theses does not appear to have an impact on collaboration, given that approximately the same percentage of women and men collaborate and do not collaborate.

Table 5

Gender of Spanish supervisors and doctoral students in Education theses awarded special honours

Number of supervisors	Gender	% of theses	Percentage of female doctoral students
One supervisor	Female	39.39	69.23
	Male	60.61	60.00
Two co-directors	Two women	18.37	100
	Two men	36.73	55.56
	Mixed*	44.90	65.22
Three co-directors	Two women and one man	66.67	50
	One woman and two men	33.3	100
	Total	100	67.06

*Note: * In 12 cases, the first supervisor is female, and in 10 cases, the first supervisor is male.*

Going into even greater detail, it is possible to analyse the relationship between the gender of the thesis supervisors and the doctoral students (Table 5). The findings indicate that there is a tendency for both to be of the same gender, especially in cases of co-supervision. Indeed, considering that 67.1% of the award-winning theses are written by female doctoral students, it can be seen that if the collaboration in the supervision is between two women, all the doctoral students are women, and if it is between two men, the percentage of female doctoral students is 55.5%. If there is no collaboration, in 69.2% of theses whose supervisor is a woman, the doctoral candidate is also a woman, and if the supervisor is a man, this figure drops to 60.0%.

Discussion

This research has yielded very interesting findings on collaboration in the supervision of doctoral theses awarded special prizes in Education.

A first finding is the significant development of this practice. Thus, it has been found that the majority (61.2%) of award-winning theses have been developed under the supervision of two or three people, a percentage that increases to 85.7% in the case of theses in the form of a compendium of publications, or to 74.5% if the thesis received international recognition. Assuming that theses with special awards are good theses, these high figures are consistent with the idea expressed in much of the literature that co-supervision contributes substantially to increasing their quality (e.g., Kálman et al., 2022; Pyhältö et al., 2023; Wald et al., 2022).

However, this research has also found that the most common model of collaboration is between teachers with different levels of experience in the task, i.e., co-supervision of doctoral theses is understood as a form of training for novice supervisors who work together with others from the same university and field of knowledge but with more experience. Thus, considering that these are award-winning theses and, therefore, of high quality *a priori*, it can be deduced that this collaboration is playing an important role in the training of new supervisors. This is in line with the analysis of Almlöv and Grubbström (2023), for example, based on the experience of collaboration between experienced supervisors and new ones in Sweden. This idea clashes both with the regulations, which justify the existence of more than one supervisor for reasons of thematic interdisciplinarity or national or international collaboration, and with much of the literature that attaches great importance to international collaboration or interdisciplinarity (Watts, 2010).

In fact, the data indicate that international collaboration is still in the minority (in 3.5% of theses) and only in one case is it due to international co-supervision, so the push for co-supervision due to the increase in international co-supervision (at least among the award-winning theses) can be classified as anecdotal. This result is clearly in line with the words of Boncheva et al. (2025), who point out the need for doctoral programmes to be redesigned to include international collaboration as a sign of excellence. Although, in the case of this research, perhaps the reason is that it is not easy to obtain the extraordinary prize under an

international co-supervision, but that hypothesis remains open to future research. On the contrary, national collaboration is more common, occurring in 25.0% of co-supervisions, although in reality it should be called regional collaboration, given that it mostly occurs between teachers located in the same region.

Interdisciplinary collaboration, i.e. collaboration between at least one supervisor from Education and another from any other disciplinary field, is also not very widespread. It occurs in 19.4% of collaborative theses. Furthermore, this occurs largely in theses in Developmental and Educational Psychology with lecturers from other areas of Psychology, which calls into question their interdisciplinarity. Of course, if these cases are understood as interdisciplinary, the figure increases slightly to 32.3%.

The study of gender in thesis co-supervision indicates, first of all, that the most widespread co-supervision model is the mixed model, which occurs in 51.1% of theses. And in 52.0% of these theses, it is a woman who assumes the supervisory role. These figures are significantly higher than those provided by Villarroya et al. (2008), who, analysing 1,054 doctoral theses defended in Spain between 1990 and 2004 in all fields of knowledge, identified that only 2.6% of theses in Social and Legal Sciences were co-directed by a mixed team, the lowest of all areas. In all likelihood, the significant differences can be explained by the major changes that have taken place in thesis supervision in the 20 years since their analysis. However, there is agreement with the analysis by Villarroya et al. (2008) regarding the relationship between the gender of the supervisors and the doctoral student; thus, when there are two women as co-supervisors, the doctoral student is always a woman, while if the co-supervision is mixed, only 65.2% are women, and if there are only two men, only 55.6% are women.

Conclusions

With all this in mind, it is possible to make some recommendations aimed at both the people involved in the theses and the institutions that host them.

The first suggestion must necessarily be to continue to encourage collaboration in thesis supervision. The fact that so many award-winning theses have more than one person taking on supervisory roles supports the idea that co-supervision has a direct impact on the quality of the thesis. Given that collaboration is even greater in compendium theses, this idea is reinforced.

However, there is still little interdisciplinary collaboration, as well as collaboration between lecturers from different universities, and international collaboration is also very scarce. These are three aspects that must continue to be reinforced in order to improve the quality, visibility and internationalisation of doctoral theses.

This research has demonstrated the strong relationship between the experience and academic impact of at least one of the supervisors and the awarding of an extraordinary prize. It is therefore important to encourage lecturers with experience in thesis supervision and academic impact to become involved in thesis supervision. This means recognising their work. It is also a recommendation for future doctoral students: choosing, as far as

possible, experienced supervisors with academic impact is a guarantee of a high-quality thesis.

In this regard, the finding of a high number of collaborative theses in which the supervisors have significant differences in research experience and academic impact is particularly striking. Thus, collaboration appears to be a sound strategy for training thesis supervisors.

This research has focused on collaboration in doctoral thesis supervision, an area that has been little studied globally and, until now, unexplored in Spain. The approach adopted is novel, as it analyses the most outstanding theses: those that have received awards. The results obtained are revealing and offer a glimpse of a reality that is rapidly gaining relevance.

However, this work has some limitations that should be noted. On the one hand, it is based on the premise that award-winning theses are the best, at least within their university and graduating class. However, the criteria for awarding these prizes are not always based exclusively on the quality of the theses, which means that they do not necessarily represent the best. On the other hand, focusing exclusively on award-winning theses makes it difficult to determine whether the findings are applicable only to these or whether they extend to all theses. This focus on successful outcomes leaves out key issues, such as what happened to unsuccessful theses, the supervision process over the years, the distribution of roles between co-supervisors, and the degree of prominence of each.

In this regard, it is essential to continue developing research on doctoral thesis co-supervision, not only through bivariate associations as has been done in this study, but also with multivariate logistic regression methods that allow us to delve deeper into the underlying interaction hypothesis between the gender of the co-supervisor and the doctoral student. It is necessary to "open the black box" and explore what happens in co-supervision processes: how co-supervisors and doctoral students feel, what types of leadership are exercised, what roles are assumed, and how these factors relate to the success or failure of theses. It would be relevant to extend the study to non-awarded theses and other academic disciplines to compare forms of collaboration between different areas of knowledge. Likewise, an international analysis of co-supervision in different countries could offer valuable ideas for improving this area.

The doctoral thesis marks the beginning of a research career. Promoting research in a country and maximising its impact on education and society requires excellent training for young doctoral students. This involves not only improving the quality of doctoral programmes, but also recognising the fundamental role of supervisors and co-supervisors, who, through their example, guide doctoral students' first steps in the field of research.

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Appendix 1. List of doctoral theses analysed

Abós Catalán, A. (2019). *Psychological functioning in secondary school teachers: Influence of motivational variables and effects of a physical activity programme* (Doctoral thesis, University of Zaragoza). <https://zaguan.unizar.es/record/87137/files/?ln=es>

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