

Application for participation at the Doctoral Forum

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(in total max 1500 words)

Description of doctoral research project (including research questions, theoretical background, planned methodology, current status)

Introduction and objectives

Women's participation in higher education and science as an indicator of social and economic progress has attracted considerable attention from individual researchers and national and international organizations. A variety of initiatives have been undertaken to analyze the participation of women in science and higher education and to promote gender equality. The latest data published by the OECD (2013) indicate that, despite some progress, gender inequalities in higher education and science persist. In OECD countries, younger women have higher attainment rates than younger men in upper-secondary and tertiary education. In 2011, an average of 84% of younger women attained at least upper-secondary education, while 81% of younger men did. While the proportion of women is relatively high at the level of tertiary education, that proportion diminishes in the later stages of academic careers, especially in top-level positions; and women receive lower wages than those of similarly qualified men. As is also indicated in the UNESCO World Atlas of Gender Equality in Education (2012), enhanced access to higher education by women has not always translated into enhanced career opportunities. In addition to working conditions, including differences in salary, women encounter bias at many levels in their academic careers: they receive less funding through research grants; they are significantly underrepresented on the boards of research institutions, research teams, funding organizations, scientific councils and academies; and they are rarely found among the heads of higher education institutions (LERU 2012). In order to close the gaps in the participation of women in science and higher education, several national research councils around the world are conducting in-depth studies and monitoring activities on the issues of research funding, decision making and balance in research teams in relation to gender (European Commission, 2009; 2014). However, the above-mentioned issues have attracted substantial attention only fairly recently (EC. 2009). Furthermore, the large body of research in the area of women in science and higher education does not provide a systematic and comprehensive overview of the research in this area. Therefore, the main objective of my thesis work has been to

assess and map international research concerning gender in science and higher education. To do this, three different studies were designed: First, to examine the development and growth of scientific literature on women in science and higher education, Second, to map and analyze the structure and evolution of the scientific literature on gender differences in higher education and science, focusing on factors related to differences, and finally to investigate the relationship between gender and research funding and teamwork.

Methodology

For the first study (development and growth of scientific literature on women in science and higher education), a total of 1415 articles and reviews published between 1991 and 2012, were extracted from the Thomson Reuters Web of Science database. In order to retrieve the related scientific literature different strategies were followed as shown in Figure 1. First, three different searches were carried out, taking into account the three main topics in the field: publication productivity, issues related to gender in academia and science, and factors related to gender bias (Table 1). To do so, for each topic, we went through the related literature with the purpose of identifying the related key terms. A preliminary combination of key terms was used to extract the papers related to the subject. Next, after reviewing the keywords of these preliminary papers, we added more specific terms to the query in order to check whether these new terms increased the number of records retrieved; if they did, they were included in the query, and if not, they were eliminated. As a result of this step, 2082 records were initially retrieved for the first topic, 12,770 for the second topic and 3545 for the third topic. Titles and abstracts from these three pools of papers were then checked one by one to find related records. As a result of this step, a total of 1746 papers were retrieved: 416 (23.83%) records for the publication productivity topic, 651 (37.29%) records for the issues related to gender in academia and science topic, and 679 (38.88%) records for the factors related to gender bias topic. After elimination of duplicates a total of 1225 records were considered. Additionally, and in order to ensure that all the references dealing with the subject were included in the database, the references of the most recent papers were checked. If any new paper was found it was added to the database, and we continued doing this until no new references were identified. This process led to the inclusion of 190 new papers. As a result the final corpus comprised 1415 articles and reviews.

Table 1. Three main topics in the literature on women in science and higher education (1991-2012)

Topics	Meaning
Publication productivity-Topic 1	Those papers addressing scientific productivity, citation, and collaboration patterns.
Issues related to gender in academia and science- Topic 2	Papers addressing elements that have an influence on the development of a scientific career, such as interviewing and hiring, salaries, promotion and advancement, having access to funding, mentoring and networking, and being a member of an editorial board or a peer reviewer
Factors related to gender bias- Topic 3	Papers that study the factors which affect the performance of researchers in the two above-mentioned groups of scientific activities including family-related issues or structural/institutional, professional, biological, psychological, social, and political variables.

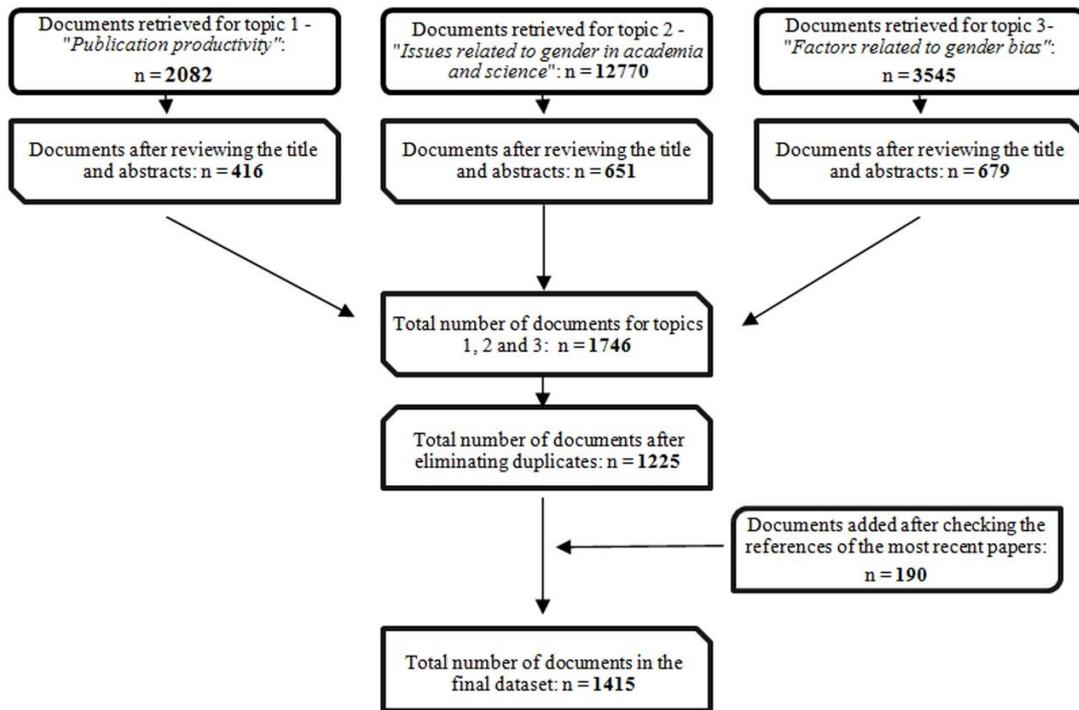


Fig 1. Flow chart illustrating the process of data collection for the first study

The methodology and procedures employed included standard bibliometric indicators and laws (e.g., Price's, Lotka's, and Bradford's laws), Relative Intensity Index (RII) and the Gender Inequality Index (GII).

For the second study (mapping the evolution of scientific literature on gender differences), the data set comprised a corpus containing 651 articles and reviews published between 1991 and 2012, extracted from the Thomson Reuters WOS database. Different steps were taken in order to extract the data set, as shown in Figure 2. After conducting a search by using a preliminary combination of key terms, a total of 50,970 records were initially retrieved. In a next step, records were refined by subject area, such that those papers classified in research areas not directly related to the topic were discarded (e.g., history, zoology, toxicology, allergy, and transportation). Titles and abstracts from the remaining pool of papers (n = 12,743) were then manually checked to find related records. A corpus of 651 articles and reviews dealing with factors related to gender differences in science, published between 1991 and 2012, were finally used. In order to study the evolution of the topic and to see how the results changed over time, the records were divided into three consecutive sub-periods: 1991-2001, 2002- 2007, and 2008-2012.

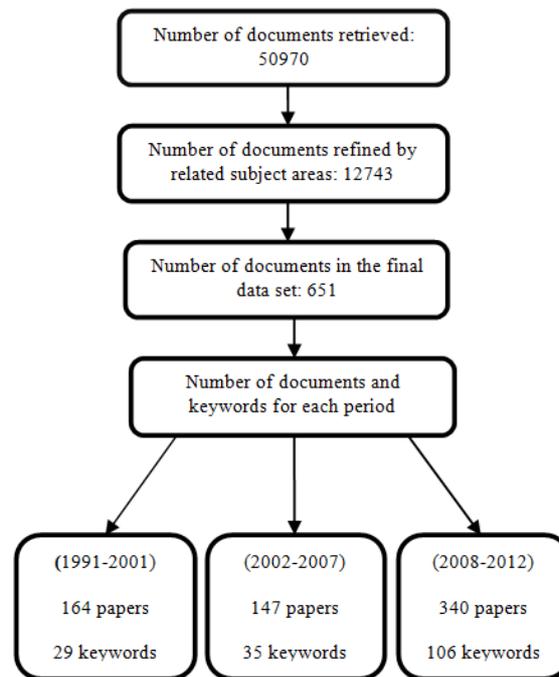


Fig 2. Flow chart illustrating the process of data collection for the second study

Data sets were evaluated for different time periods; co-word analysis and hierarchical cluster analysis were undertaken.

The data set for the last study (relationship between gender, different aspects of research funding and teamwork) comprised 1007 articles published in the field of Neuroscience indexed in the WOS database between 2009 and 2013. To do this, we used stratified random sampling. The sample size was determined with a 3% sampling error and 95% of level of confidence. As a result, 1,060 papers in Neuroscience were considered as sample and downloaded from the WOS. Finally, after eliminating those papers whose gender was unclear i.e. 53 (5%), our dataset comprised 1007 (95%) of 1060 papers.

Presences of women per paper and authorship positions (first author, corresponding author and last author) by gender were analyzed. Gender composition of author teams was also studied by examining whether male and female authors had the same gender collaborators in authorship teams (i.e. female-only teams, male-only teams, female-male teams). In order to see how different aspects of teamwork as mentioned above affect the overall Impact of teamwork publication, the number of citations per paper and impact factor of journals were also studied. Additionally, different aspects of funding including the number of funding sources, nature of funding sources, type of funding sources and internationality of funding sources were examined.

Current status

I am in the third year of my PhD. I have achieved the following results with regard to the objectives of my thesis:

One study has been published in the journal of *Scientometrics*:

Dehdarirad, T., Villarroya, A., & Barrios, M. (2014). Research trends in gender differences in higher education and science: a co-word analysis. *Scientometrics*, *101*(1), 273-290. doi: 10.1007/s11192-014-1327-2

Another study is in under review in the journal of *Scientometrics*:

Dehdarirad, T., Villarroya, A., & Barrios, M. (under peer review). Research on women in science and higher education: a bibliometric analysis. *Scientometrics*

The third study is in progress. It is entitled:

Teamwork and funding: Does gender matter?

Some studies extracted from my thesis were presented in International conferences:

ISSI 2013 - 14th International Conference on Scientometrics and Informetrics, July 15-19, 2013, Vienna, Austria.

STI 2013- 18th International Conference on Science and Technology Indicators, September, 4-6, 2013, Berlin, Germany.

COLLNET 2014- 10th International Conference on Webometrics, Informetrics, and Scientometrics (WIS) and the 15th COLLNET Meeting , 3-5 September, 2014, Ilmenau, Germany.

Motivation for student participation at the Doctoral Forum and the issues you wish to receive feedback on from the senior researchers.

I believe that the Doctoral Forum would provide me with an exciting and supportive environment. I would relish the opportunity to partake in dialogue with researchers in my field. The opportunity to share ideas and interact with scholars who share similar research interests would be invaluable for my studies and development. Thus, the Doctoral Forum would give me an excellent opportunity gain feedback on my research from scholars in my field of study and improve my PhD work.

It would be great if the researchers could advise regarding related studies, further studies that can be performed, different methodological approaches that can be used etc.

References

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