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Reviewing research on researchers: Our knowledge of early-career researchers in Latin America and the Caribbean

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ABSTRACT

This working paper is a systematic review of 101 articles dealing with early-career researchers (ECRs) in Latin America and the Caribbean. While the social study of science and higher education in this region has developed for several decades, the social contexts in which ECRs' trajectories take place have been scarcely explored. In analysing the ways in which the literature has studied this issue, we found that the most dominant themes are growth and transformation in research and higher education, academic productivity and efficiency, issues in the labour market and job insecurity, international mobility and, to a lesser extent, gender and diversity. Strikingly, by examining these themes regarding the intersection between micro-, meso- and macro-dimensions of social activity and individual agency, we demonstrate that this literature is silent about the actual experience of ECRs. Thus, this literature overlooks the interactions between individuals' capacity to act as social agents and the structural affordances and constraints that shape their career trajectories. The paper signals the most significant gaps in this body of literature, including empirical, methodological and conceptual issues, which we argue have influenced the present state of the evidence. This results in a clear agenda for future research.

Keywords

Early-career researchers; Latin America; Caribbean; nested contexts; structural factors; individual agency; meso-organisational context; everyday practices

Citation

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INTRODUCTION

This working paper provides a systematic review (Grant and Booth 2009) of the literature dealing with early-career researchers (ECRs) in Latin America and the Caribbean. The Global Young Academy (GYA) is currently conducting a study dealing with the state of ECR in this region (GloSYS LAC) and our aim in this paper is to develop a solid knowledge base to conduct further empirical research on this topic. We have conducted this review with the conviction that examining how ECRs have been addressed in the scholarly literature can help make future studies about the global state of young researchers robust, critical and insightful.

We report here on the empirical literature and assess three central issues that appear in the 101 articles in Spanish, Portuguese and English that we have reviewed: 1) what empirical evidence exists; 2) what research designs do they use to draw out evidence; and 3) how are they framed conceptually. In examining these three facets, we particularly focus on the extent to which the articles address different realms of social activity (namely the structural, institutional and everyday work environment) and their intersection with individual agency.

Although the term ‘early-career researcher’ often appears in the literature as a descriptor of doctoral graduates working as academic researchers, the meaning of the term is often not clearly specified. In this review, by ECRs we mean researchers with a background in any discipline, working in higher education, private or public organisations, or private companies, and pursuing a research-oriented career. An ECRs generally has a PhD and are within ten years of graduation.

Little research has been conducted on ECRs in Latin America and the Caribbean, which contrasts with the growing attention that they have received over the past 15 years in other parts of the world, particularly in North America, Western Europe and countries in Oceania. Consistent themes include: fewer academic positions than PhD graduates and long periods of financial insecurity (e.g., Åkerlind 2005); increasing demands and expectations for individual accountability or productivity (often using quantitative measures; e.g., Kyvik 2013); international mobility as a norm (e.g., Auriol et al. 2013), and also potentially an advantage (e.g., Horta 2009); limited research funding (e.g., Debowski 2012); and some attention to gender and diversity (e.g., Haake 2011).

Despite the lack of attention to ECRs, the social study of science has grown in Latin America and the Caribbean since the 1970s (Vessuri 1987, 2019). There is presently a body of literature – particularly in the fields of science and technology studies, as well as higher education studies – providing telling accounts of the practices and contexts of scholarly research in the region (e.g., de Wit et al. 2005; Sebastián 2007; Schwartzman 2008, 2020; Aupetit and Gérard 2009). There are also detailed studies about the internationalisation of higher education in various Latin American countries (e.g., Araya 2015; Araya and Oregioni 2015). While part of this work marginally alludes to ECRs, it tends to ignore the influence of variation in experiences and circumstances among

researchers with different degrees of seniority. In this way, researchers may be distinguished by their discipline, gender or country in which they work, but rarely by the stage of their career development. In this review we make explicit how ECRs have been studied in this region and what areas remain to be examined.

The international literature on ECRs seeks to understand the social dynamics behind their career trajectories, especially how they become established as researchers and the type of support that they require to develop their careers (Hemmings 2012). This research can be characterised as highlighting either individual or structural factors. The former studies document the perceptions of individuals' career decisions and experiences. However, such perceptions are usually not contextualised in broader social contexts, lacking references to actual work or study responsibilities, organisational structures or national influences. Examples come from research focusing on career motivations for doing a PhD (Mangematin 2000) or perceptions of non-academic jobs as being more attractive than traditional academic careers (Neumann and Tan 2011). More recent analyses have incorporated attention to agency (motivation, intention, emotional investment; Thiry et al. 2015) and the influence of personal lives on work and study decisions (McAlpine and Amundsen 2018).

Another group of studies examines structural factors influencing PhD career trajectories using the perceptions of supervisors and employers, as well as desk research, but rarely link these to the intentions, goals and personal life factors of PhD students and PhD graduates. For instance, some studies focus on the influence of research assistantships on degree completion compared to other forms of financial support (Ampaw and Jaeger 2012), or on how fluctuations in national economies impact the hiring of PhD graduates (Oyer 2006).

A critique of studies on PhD and post-PhD experiences is the failure to capture the interaction of individual and structural factors in individuals' career decisions (regarding all careers, see Jiang and Shen 2019; for PhD careers, see van Balen et al. 2012; O'Meara et al. 2014; Pedersen 2014; McAlpine and Amundsen 2018). We draw on this integrative approach in our review to document the extent to which this literature addresses the intersections between individual and structural factors that affect ECRs careers and societal integration. In particular, we use a conceptual framework, identity-trajectory within nested contexts that derives from an empirical research programme examining the PhD and post-PhD trajectories of ECRs longitudinally (McAlpine et al. 2014; McAlpine and Amundsen 2016). This work theorises career trajectories as biographical and historical processes, with work and career trajectories embedded within broader developmental life courses. Thus, work and career decisions are rooted within life goals, values, family relationships, and a search for well-being, work-life balance and financial security. Further, through time, individuals demonstrate agency to varying degrees as they navigate their lives as well as careers. In this way, individual personal factors interact with each other, for example, having

children may heighten a desire for greater financial security. Equally, these personal individual factors interact with structural ones, for example, a desire for financial security may lead to seeking a post outside academia. In other words, an individual's broader life influences the viable career options (McAlpine et al. 2014) at the time of searching within nested structural contexts (McAlpine and Norton 2006).

This conceptual framework is a prism through which to examine relationships among different contexts. The inner context is the micro, daily work environment of interactions and practices, which is nested in the meso-organisational context. Likewise, the meso takes place within macro national and international contexts in which policies and various social and economic events and trends influence the research labour market. These socio-economic trends interact with the meso-context, for example, through requirements for institutional accountability. The meso-context, in turn, influences the regimes in which daily work is enacted, for example, access to equipment or sufficient work benefits. Still, a positive meso-context may not be reflected in a positive micro day-to-day experience, for instance, if supervision is absent, negligent or abusive. Such a micro climate influences an individual's concerns and relates them to multiple contexts. These nested contexts are not spaces (although they certainly take place in specific sites and times), but collections of relationships interacting in different realms of the social. We use the notion of individual agency and broader life concerns interacting with the nested contexts to analyse how these texts focused on various realms of social phenomena and the actor as agent.

The remainder of this article is organised in three sections. The first section describes the methods that we have used for retrieving and analysing this body of literature. The second section analyses the empirical, methodological and conceptual contributions of these texts. The article concludes with an assessment of this emerging literature and an agenda for future research.

METHOD

In assessing the scientific literature dealing with ECRs in Latin America and the Caribbean, we specifically focused on the empirical evidence that these articles offer, their methodological design and their conceptual framework. We paid attention to the extent to which these studies examine social dynamics at macro-, meso- or micro- levels in relation to individual agency.

The literature search was conducted in February 2020 through the Scopus, Web of Science and SciELO web engines. The base search terms we used were 'Latin America', 'Latin America and the Caribbean', 'Caribbean' and the name of each country in this region.¹ These terms were combined

¹ See the full list of countries in appendix 2.

with the following keywords: 'early career*', 'young academic*', 'young investigator*', 'young researcher*', 'young scientist*', 'junior academic*', 'junior investigator*', 'junior researcher*', 'junior scientist*', 'doctoral*', 'PhD*'. These keywords were searched in English, as indexed articles in these databases feature keywords in this language despite being written in another one. A second search was conducted in the Scopus database in June 2020 to include the term 'master*' with the aforementioned series of terms. We decided to include discussions about Master's students and graduates because some studies suggest that there is a significant proportion of young researchers who have not earned a PhD yet, and are pursuing research-oriented careers and working full-time as researchers in Latin American countries (e.g., Galáz Fontes and Gil Antón 2009; Gil-Antón et al. 2016). Still, this supplementary search revealed a very small number of relevant articles. These searches collected articles published between 2010 and 2020, as considering articles published more than ten years ago would refer to a different social context.

These searches yielded 2,053 texts after removing duplicates, which were imported into a reference management software. In appraising these articles, we included those that address issues of higher education or scientific research in at least one country in Latin America and the Caribbean, and that have at least a minimal reference to ECRs. We identified 126 articles from which 101 were empirical studies, 22 were non-empirical texts that elaborated their arguments as opinion pieces, essays or letters to editors, two were conference papers and one was a book chapter. We focused our analysis on these 101 empirical studies, from which 43 are in Spanish, 33 in English and 25 in Portuguese.

We examined the texts using a customised table that recorded: a) conceptual framework (if any), b) methods c) discipline d) country/university location; e) research design; as well as f) findings categorised as to micro-, meso- or macro-contexts and/or individual agency. To develop this table, three of the authors read and then discussed five English articles at the time, exploring and resolving issues, for example, how to define the emerging themes and how they relate to nested contexts. The articles in Spanish and Portuguese were then read by two of the authors given their linguistic abilities. The notes from these readings were included in English in the customised table and discussed with the other two authors. Throughout the analysis of the texts, the authors classified the articles' themes, disciplinary approaches, data collection methods and analyses, and methodological and conceptual contributions. Special emphasis was put into identifying the micro-, meso- and macro-contexts and reports of individual agency in this literature.

In seeking consistency in our analysis, we developed definitions of the key emerging themes, established their rationale for use, and identified references of these themes in the international literature. In order to condense our data (Miles and Huberman 1994), we created a spreadsheet that synthesised the themes, methods, language, disciplines, and countries in which the articles

concentrate. We also elaborated tables to identify the relationship between the themes and the context on which they focus (micro, meso or macro), the discipline that they refer to, the type of empirical data they use, and the degree to which ECRs' agency was reported.

FINDINGS

Overall, these studies take a stance that emphasises structural and institutional contexts. Forty-nine articles concentrate exclusively on the meso-level, 14 on the macro-level, and 11 on the micro-level. There are also articles that attend to interaction between different contexts, congruent with the notion that they are nested: micro- and meso-dynamics (20 articles), meso and macro (three articles), micro and macro (three articles), and the three realms (one article); see Figure 1. Notably, these studies do not examine individual agency or life course factors influencing career, work experiences and decisions among ECRs. The closest examples come from articles looking at how structural factors influence motivation related to work and study.

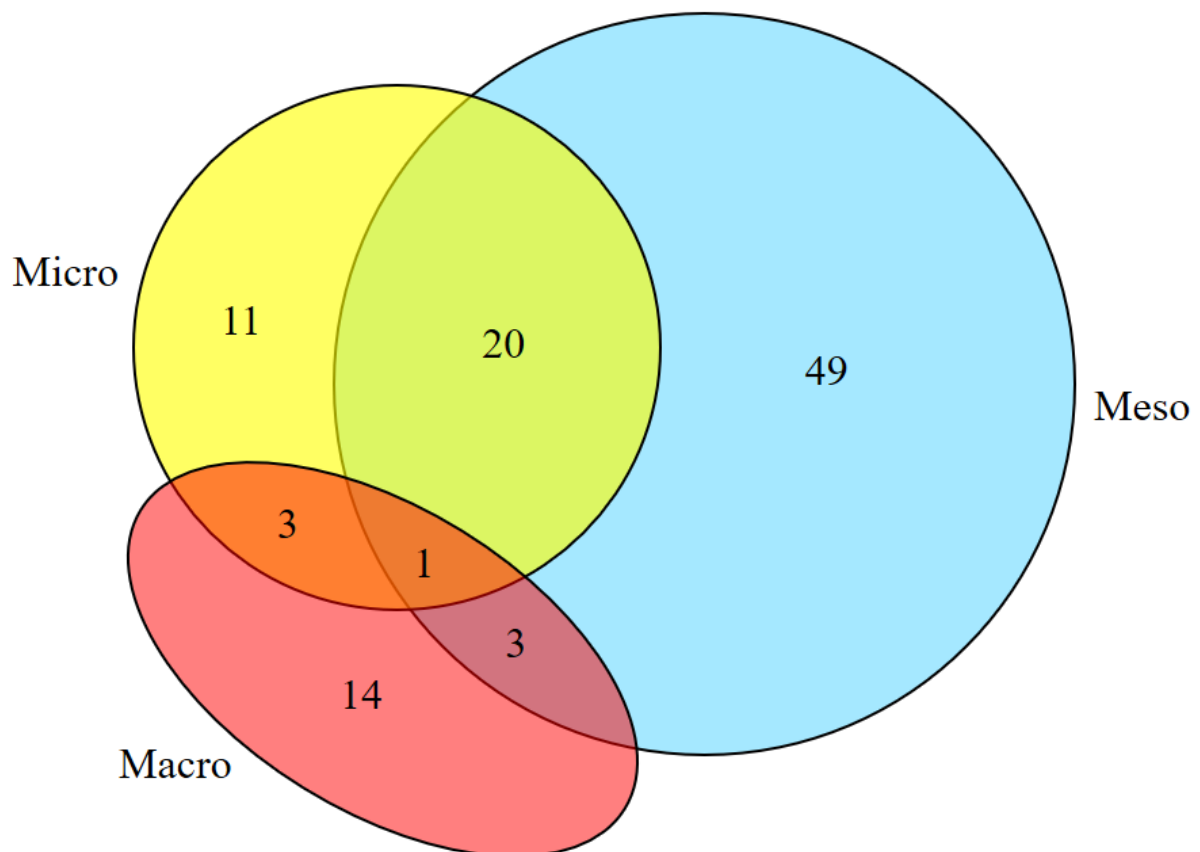


Figure 1. Nature of context focused on in studies

Countries

Almost half of the articles reviewed stemmed from Brazil, were published in Brazilian journals, and made Brazilian research the subject of discussion (see Figure 2). Within this set of articles, more than one-half were written in Portuguese and the rest in English (see Figure 3). In contrast, most articles written by scholars based in Spanish-speaking countries were written in Spanish, with just a few in English referring mostly to Mexico and Argentina.

Brazil	Mexico	Paraguay	Puerto Rico	Venezuela	Various
		Cuba	Bolivia	Uruguay	
		Colombia	Ecuador		
	Peru				
	Argentina		Chile		

Figure 2. Distribution by country

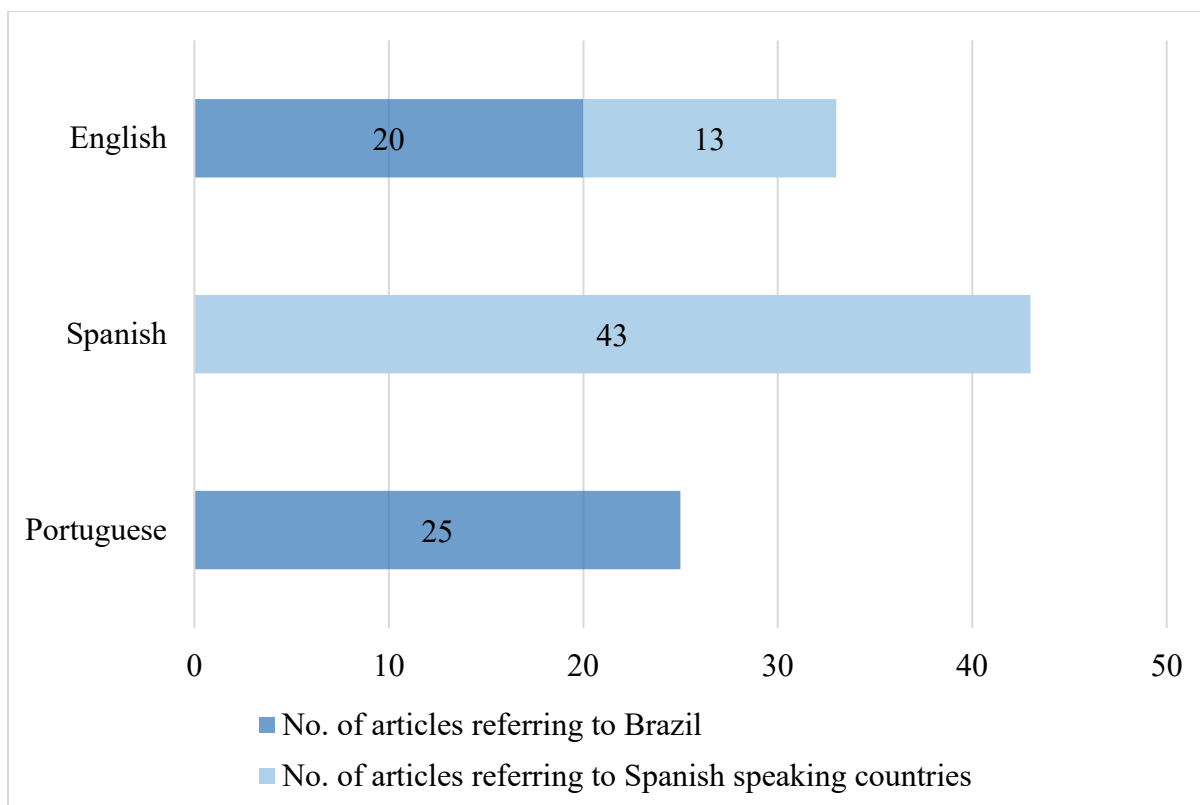


Figure 3. Distribution by language and country

Journals

The articles were published in journals situated in a range of disciplines, mostly in the fields of education, health sciences and social sciences broadly conceived. We do not identify in this literature the formation of disciplinary communities in a particular country, publishing in either Spanish, Portuguese or English. Instead, there are scholars referring to ECRs who publish their work in journals with very different scopes. Thirty-nine articles are published in journals in the field of education, from which three are in journals overlapping education with general social sciences, computer sciences or engineering. Eighteen articles are located in a range of specialities of the health sciences. Several journals publishing articles on ECRs have a broad social sciences perspective (12), or overlap the social sciences and the humanities (4), whereas very few are clearly multidisciplinary (2).

Types of data used

This emphasis on disciplinary and institutional transformations partly results from the limited methodological repertoire that is used to investigate ECRs. Notably, almost half use secondary data in their analyses, probably owing to the fact that this information is readily available and

publicly accessible. National databases such as those from CAPES and Lattes (CNPq)² inform a large number of studies reporting on recent transformations in the higher education system in Brazil. In contrast, the remainder use a range of original data collection tools, mostly through quantitative protocols (30 articles), qualitative interviews (18 articles) – with even fewer using qualitative questionnaires (six articles), focus groups (two articles) and participant observation (three articles). Finally, there are no longitudinal perspectives providing accounts on the trajectories of ECRs.

Thematic clusters

We found five areas of focus varying in size among these articles. The ‘growth and transformation in research and higher education’ integrates the largest cluster, followed by ‘academic productivity, efficiency of specific programmes and mentorship.’ Issues of ‘job insecurity, funding and work precarity’ constitute another relevant group of interrelated themes. Finally, ‘international mobility and migration,’ and ‘gender, diversity and intersectionality’ are examined by a smaller number of studies. As can be appreciated in Figure 4, the meso-level is emphasised – even between contrastingly different themes such as academic productivity, job insecurity and gender.

² CAPES is a Brazilian federal government agency overseeing undergraduate and postgraduate institutions. The acronym stands for “Coordination for the Improvement of Higher Education Personnel” in Portuguese. This institution maintains a large database on higher education issues. The Lattes Platform is an integrated database maintained by the Brazilian federal government to manage information on science, technology, and innovation. It is managed by the National Council for Scientific and Technological Development (CNPq).

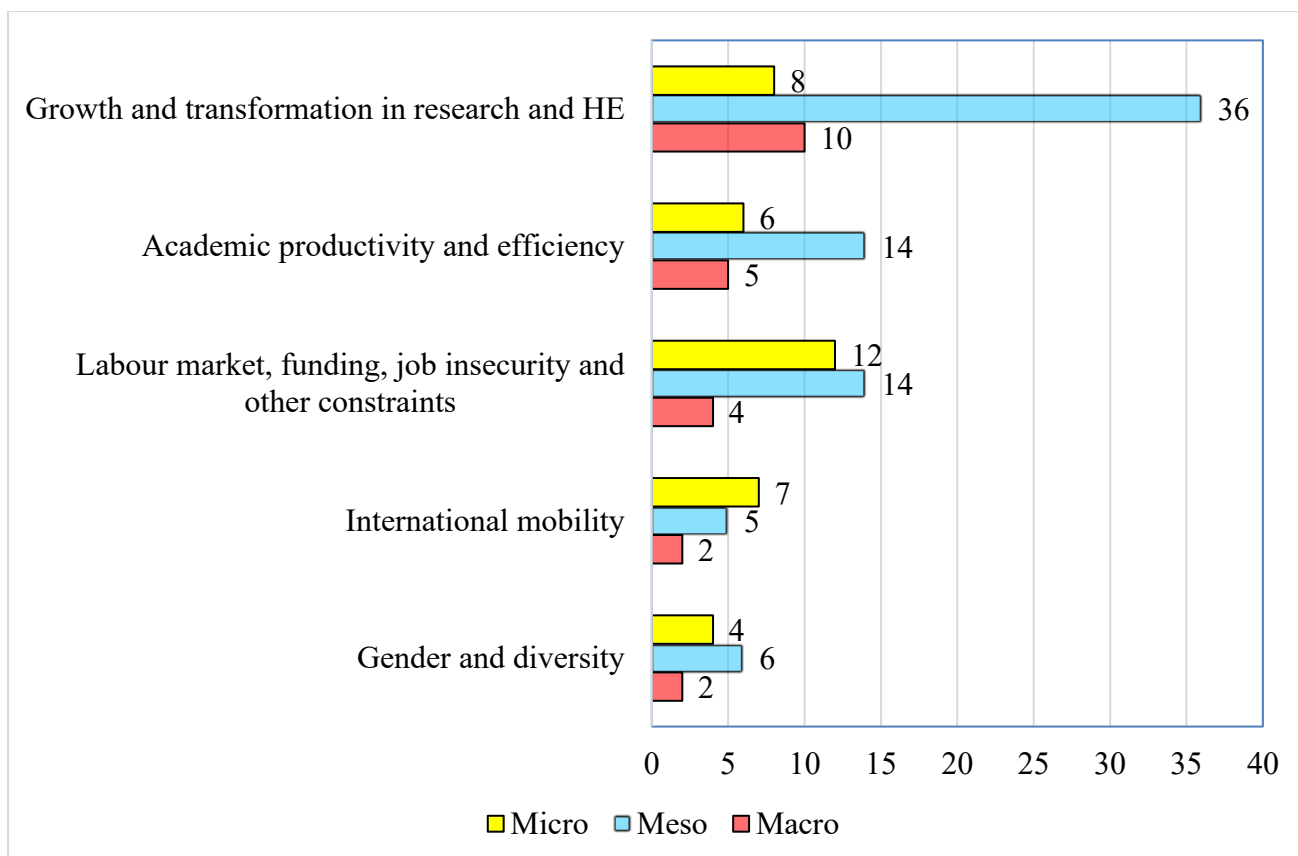


Figure 4. Number of articles per theme and context

Note: As mentioned, we reviewed 101 articles. While some refer to one context and theme, 26 articles address two contexts and one article three. Also, six articles deal with two themes. Therefore, the total sum of articles in Figure 4 is higher than the number of articles reviewed.

Growth and transformation in research and higher education

These 46 articles focus on the recent growth and transformations in the higher education and research systems with a strong focus on the meso-level. The articles seek evidence of the increase in enrolment ratios, number of full-time employed researchers and greater volume of scientific publications that have been noticed in the Latin American literature more generally (Ferreyra et al. 2017; Brunner and Labraña 2020). While this gradual development of scientific activity in the region has been widely reported (Schwartzman 2020), these articles describe such developments through the prism of certain disciplines, their local higher education systems and institutional programmes. These studies often incorporate reports on undergraduate, Master's and PhD programmes. References to ECRs are largely in relation to institutional meso-factors related to PhDs, such as programmes, theses and participation rates. At the macro level, there is also some discussion regarding the need to prepare researchers for non-academic work – which is a major concern in the international literature and policies in the Global North (e.g., de Grande et al. 2014).

We grouped these studies into three sub-themes: development of specific disciplines (22); changes in higher education systems (16); and characterisation of programmes (8). See Appendix 1 for details.

Development of specific disciplines

In total, 22 studies examine the development of a discipline or subfield at the national level. These studies tend to focus at the meso-level and discuss the expansion of particular higher education programmes, including PhDs (e.g., Brock et al. 2010; Ferreira 2015), describing their development during the past decades. Some of these articles develop retrospective analyses of the growth of a discipline based on quantitative indicators, for instance, by looking at the number of theses produced in a specific field in a given period (Martínez Rodríguez and Solís Cabrera 2013; Oliveira et al. 2014). Some other articles situate single disciplines in relation to the recent development in higher education systems at the macro-level, with references to the lack of access to resources or recent changes in academic subfields.

Despite the noticeable expansion and institutionalisation of many scientific disciplines in the region, the articles raise concerns about the capacity of higher education systems (macro) to integrate the increasing number of doctoral graduates (Marengo 2019). These articles suggest the following as being crucial for further science development: greater internationalisation of scientific activity to expand research capacity (Martínez Rodríguez and Solís Cabrera 2013; Marengo 2014); integration between science and practical education within higher education programmes (Montalvo-Javé et al. 2016; Farfallini et al. 2018) to better prepare PhD and Master's graduates for non-academic employment.

Changes in higher education systems

Closely related to the development of specific disciplines is the analysis of how higher education systems and institutions have changed in recent decades. Accounts of the growth of higher education and research systems constitute a substantial part (16 out of the 46 articles) of this literature (e.g., Helene and Ribeiro 2011; Acosta and Celis 2014; Roos et al. 2014). In terms of nested contexts, these studies tend to examine global and national systems (macro) in relation to different international disciplinary regimes, occasionally drawing comparisons between regions or countries in the Global North vs. the Global South. Several studies suggest that ECRs are affected by a considerable centralisation of higher education and research institutions in specific geographical regions within countries, and describe some of the efforts to decentralise scholarly research in Brazil and Mexico (Acosta and Celis 2014; Bin et al. 2015a; Flores Osorio 2018).

There are four studies that specifically deal with changes in higher education institutions predominantly at the meso-level. Generally, these studies acknowledge an increase in doctoral programmes and student enrolment over time, conceptualising it as a process of 'postgraduatisation'. These studies do not investigate the programmes themselves, but rather examine the influence of national and international public and institutional policies at meso- and macro-levels. For instance, the studies analyse the impact of the greater offer of scholarships (Unzué and Rovelli 2017) or networks of collaboration among different institutions (Do Nascimento and Beuren 2011). Moreover, they assess policy effects on specific outcome variables such as international mobility (Ramos and Velho 2013) and publication practices (Ortíz Acle et al. 2018).

Characterisation of programmes

Descriptions of Master's and PhD programmes also seek to account for recent changes in the higher education systems in this region. Eight studies highlight the value of particular programmes, describing their mechanisms and virtues, or delineating their historical backgrounds (Ramos et al. 2010; Bin et al. 2015b). These articles mostly focus on the degree of, or increase in participation and graduation rates, often referring to measures of institutional accountability that demonstrate meso-level efforts to develop research capacity. Two studies deal with the interaction between the personal and the meso-level analysing overall satisfaction (Nepomuceno and Costa 2012) or individual motivation to participate in a given programme (Grijalva Verdugo and Urrea Zazueta 2017). None of these studies develop a rigorous evaluation of policies or programmes, or examine the actual experiences of participants.

Academic productivity and efficiency

Discourses of academic efficiency and productivity in certain Latin American countries are discussed in another cluster of 17 articles. These articles adhere to managerial perspectives applied to research activities among ECRs to various degrees: some seek to indirectly measure success and efficiency using proxies such as number of publications (Falaster et al. 2016) or collaboration with peers (Dias-Neto et al. 2015), while others look at how mentorship or motivation may set the conditions for academic achievement. Within the international literature studying the production of knowledge, Gibbons et al. (1994) suggest that this turn to business-sector perspectives is in part the consequence of the massification of research and education. Literature in the Global North has explored how this logic conflicts or agrees with academic values (e.g., Hyde et al. 2013), and how it is gradually transforming the nature of PhD education (Melin and Janson 2006). Yet, this theme remains to be investigated in Latin America and the Caribbean. The three

sub-themes are academic productivity (12), mentorship (2), and efficiency of higher education programmes (3).

Academic productivity

In total, 12 articles explicitly deal with ECRs' productivity. Most of them use quantitative proxies to measure productivity, for example, the number of publications, received grants, citations, patents or journal rankings. The studies focus largely on institutions, research teams or individuals, often combining these contexts. Several articles touch upon factors impacting scientific productivity such as English language skills, assistance with the edition and translation of texts, the academic degree that the researchers hold (Mejia et al. 2017), and their advisors' H-index (Cunha et al. 2014). The authors point out the balance that ECRs must strike between publishing, teaching and administrative tasks in their daily work (Farji-Brener and Ruggiero 2010; Gómez Nashiki et al. 2014; Ortiz-Torres 2019) – if they are employed as traditional academics.

Mentorship

Two papers analyse the productivity of ECRs in relation to mentoring programmes (though the nature of the programmes or the meaning of mentoring is not described, consistent with the international literature). Tuesta et al. (2015) indicate that the duration of the mentor-mentee relationship correlates positively with the mentees' scientific productivity. This study also suggests that the mentoring programmes could adapt better to the necessities of the mentees. As Noormahomed et al. (2015) indicate, an instance of such an adaptation could be the reduction of the mentor-mentee ratio to better support the mentees' personal development.

Efficiency of higher education programmes

Regarding the efficiency of doctoral programmes, three studies measure programme completion and the time until graduation as proxies at the meso-level. These studies show that attrition rates are considerably higher within Master's and PhD programmes among the social sciences and humanities, compared to STEMM (Wainerman and Matovich 2016). Attrition (an institutional notion that ignores the individual as actor) is conceived as a rather complex process often comprising academic exclusion and gradual decoupling (Bartolini and Gerlo 2017). As a counterpart to attrition, academic achievement in doctoral and Master's programmes is examined in relation to individual factors such as the student's perception of his or her competence, and the micro- and meso-contexts in which educational processes take place (González-Moreno 2012).

Labour market, funding, job insecurity and other constraints

Precarity, job insecurity and uncertainty in career prospects have been widely recognised in the international literature as challenges that PhD graduates very often confront (Åkerlind 2005). Similarly, PhDs experience uncertainty but in relation to the study/work environment in which they seek to complete their programmes (e.g., Sambrook et al. 2008). Twenty-two articles analysing ECRs in Latin America and the Caribbean report similar problems, particularly in relation to insecure career prospects, difficulties to secure research funding, and precarious study/work conditions that affect their well-being. This theme has four sub-themes: labour market insertion post-graduation (9), influences on participation in postgraduate education (9), PhD graduate job insecurity (2), and PhD and post-PhD funding (2).

Labour market insertion post-graduation

The insertion of graduates into the labour market is addressed by nine articles, which differentiate between various career trajectories (such as the industrial sector or forms of entrepreneurship) on the one hand, and PhD programme connections to these career paths on the other (Beltrão and Mandarino 2014; González and Jiménez 2014). The articles also examine financial incentives such as scholarships that seek to promote the research sector as a whole and to tackle socioeconomic factors affecting career development (Celis-Giraldo and Duque-Escobar 2014; Molina Fuentes 2016). These analyses develop mostly at the meso- and macro-levels – with no attention to the experiences or everyday practices of individuals.

Influences on participation in graduate programs

Here we see both affordances and constraints. Five articles discuss different elements at the micro- and meso-levels that persuade students to engage in Master's and doctoral programmes (González-Moreno 2012; Ferreira and Tavares 2013; Celis and Duque 2016; Durso et al. 2016; Núñez-Valdés et al. 2019). Adequate funding (scholarships in particular) and the expectation of earning a better salary after graduation are indicated as relevant personal factors that motivate their participation.

In contrast, three studies report stressors among PhD and Master's students. Faro (2013a, 2013b) argues that financial and time resources represent the most relevant factors affecting their well-being, followed by supervision, performance and course requirements. These two studies also suggest that women tend to be more stressed than men. Along with Koetz et al. (2013), these articles deal with the meso- and macro-levels by looking at individual stressors through the proxies of income disparity, restricted access to infrastructure and cuts to research funding at institutional and national levels.

PhD graduate job insecurity

Two articles discuss potential work precarity among postdoctoral researchers. These studies show how the number of postdoctoral researchers, as well as programmes that specifically fund postdoctoral research, have significantly increased in Mexico in recent decades. This development has enhanced the participation of women and researchers from a wide variety of socioeconomic backgrounds (Campos Ríos et al. 2011). However, these postdoctoral programmes have been characterised by precarious work conditions such as subcontracting, short-term and flexible work arrangements (Arce Miyaki and Gomis Hernández 2019), which resonate with the experiences of many ECRs in other countries in the region.

PhD and postdoctoral funding

Two studies explicitly examine research and grant funding by analysing the cases of PhD scholarships and postdoctoral fellowships (Helene and Ribeiro 2011; Pinto et al. 2014). Similar to the articles describing academic productivity, these analyses often indicate measures of success or excellence in specific disciplines or programmes at a meso-institutional level.

International mobility

A cluster of ten articles deals with ECRs' international mobility, approaching it as mostly determined by socio-structural issues. Six meso-level analyses regard international mobility both as an independent variable and an outcome variable, for example, by investigating how international mobility affects scientific collaboration (Marmolejo-Leyva et al. 2015) and how public policies can shape academics' mobility (Freidenberg and Malamud 2013). These discussions include institutional policies, not only related to the scholar-receiving and -sending position (Sacco et al. 2018), but also concerning incentives in repatriating processes that frame the mobility of ECRs in terms of 'loss' or 'gain' for national research systems (Freidenberg and Malamud 2013).

At the micro-level, four studies outline the motives and decision-making to study or work abroad (López Ramírez 2015; Moreno 2016; Ortíz and Mendoza 2016). While the trajectories of ECRs are examined, they are framed in relation to macro- and meso-contexts that constrain or enhance their career development. Finally, Turchick Hakak et al. (2010) explore the challenges faced by Latin American researchers as immigrants in a country in the Global North (a non-Latin American macro context) – a barely studied issue that highlights the relevance of investigating the circulation of knowledge, people and expertise.

Gender and diversity

There are ten articles in this cluster, eight specifically concentrating on gender. Among them, two studies (Grossi et al. 2016; Mendes and Figueira 2019) quantify women's participation in higher education institutions by examining the number of theses written by women or the number of women enrolled in doctoral programmes. Other gender studies conclude that female participation in academia has increased, although they do not address how this inclusion is experienced. Nevertheless, in comparison to men, gender prejudices and discrimination are still present in many higher education institutions (Teixeira and Freitas 2015), as well as androcentrism and sexual harassment (Celis Giraldo and Héndez Puerto 2018). As to the other two studies, one describes the theses that have been written about the institutional inclusion of students with disabilities (De Melo et al. 2019). The other study considers majority/minority relationships, studying the participation of indigenous peoples in academia in Mexico (Molina Fuentes 2016). In general, the diversity that characterises Latin America's populations has been widely disregarded when looking at ECRs (which is also the case in the Global North literature; see, e.g., Eggins 2017).

DISCUSSION

We undertook a systematic review of the empirical literature dealing with ECRs in Latin America and the Caribbean. Our conceptual and analytic approach was directed at parsing the ways in which these studies address different realms of social activity (namely the structural, institutional, and everyday work environment) and their intersection with individual agency – given the recognition in the international literature that such an approach is essential (e.g., Thiry et al. 2015). Still, there are two limitations to our analysis to name before addressing the empirical, methodological and conceptual issues of this literature.

Central to our review was the notion that ECRs are a distinct group, so we undertook a comprehensive search of literature referring to them in Latin America and the Caribbean. The notion of ECRs originates in the English-speaking literature. There is, however, no direct equivalent in Spanish or Portuguese, the languages most widely used in the region. Terms such as 'investigadores jóvenes' (young researchers in Spanish), 'pesquisadores jovens' (young researchers in Brazilian Portuguese), 'investigadores de carrera temprana' (a literal translation of ECRs in Spanish) and so forth, are only approximations to the ways in which the concept of ECRs is used in the international literature. In addition, this term is loosely defined as a category of analysis, which contrasts with how funding bodies concretely demarcate who ECRs are – often delimited by the length of time from graduation or start of doctoral degree. This lack of recognition of ECRs as a group affects our search, since they are regularly implied in broader groups of

academics and researchers. Therefore, we faced difficulties in collecting studies that explicitly focus on ECRs in this region.

We have sought to be as comprehensive as possible in our search. Yet, we excluded non-indexed texts such as grey literature and conference proceedings, as well as non-peer-reviewed publications such as book chapters and monographs. Despite running manual online searches, we still ignore the relevance and size of this type of literature referring to ECRs in the region. Academics working outside the main centres of scholarly activity probably face the dilemma of publishing for local audiences in non-indexed outlets, or rather publishing in international journals. Debates about local affairs that could resonate with larger issues in different disciplines may remain invisible because of the unequal coverage of indexed publications. Therefore, our analysis could have missed references to texts that we could not find through the methods described above.

Empirical issues

This review tells us that ECRs in Latin America and the Caribbean have not been identified as a group of individuals with distinct relationships within higher education and research systems, as well as particular preoccupations, needs and motivations. Thus, very little is known about their actual experiences, particularly regarding the ways in which their research practices, everyday life and present work circumstances intersect with socio-structural and meso-level dynamics and their personal lives. The marked emphasis on the meso-level results in a failure to consider the differences between institutions within countries since most PhDs study in research-focused institutions, but most graduates are not hired into them. Furthermore, this emphasis fails to capture how the meso- and macro- levels relate to the ways in which individuals work and study, and the effect that the overlapping of these contexts can potentially have on complex phenomena such as daily motivation or career satisfaction.

As noted earlier, there are parallels with the international literature at a broad thematic level. Yet this comparability is, we believe, superficial since the nested contexts in Latin America and the Caribbean are different from those in the Global North. Further, without evidence about ECRs' experience we cannot know how these contexts contribute to qualitatively different career trajectories. For instance, we know from studies in Africa that international mobility brings a different set of challenges for ECRs than it does in the Global North (McAlpine et al., in press), or studies of post-communist countries that ECRs tend to remain home rather than be internationally mobile (Galevski and McAlpine, in press).

Methodological issues

It appears that the majority of these studies were conducted by academics, often about their own discipline at either the national or institutional level in their own countries. As noted earlier, this is reflected in a limited methodological repertoire, with nearly half using secondary – what one might call opportunistic – data. As a result, most have a marked focus on meso- and macro-factors, particularly in relation to the reorganisation and development of disciplinary fields within their own countries. Among those that collect original empirical data, their datasets are limited in quantity and scope, and add little to the empirical knowledge base on ECRs. The strong emphasis on the meso-level fails to consider the relations between different social issues, namely the variability across types of institutions in graduate programs, supervisory and research capability, and financial support for students. Consequently, many research results are de-contextualised and make it difficult to interpret and integrate them into broader discussions about the social dynamics of scholarly research.

Most articles (91) focus on phenomena within a single nation, while only ten look at forms of collaboration or develop comparisons beyond the national level. Giugliani et al. (2015) examine cases of international collaboration in the health sciences, and Cassiani et al. (2017) analyse the development of nursing education in several countries in Latin America. Two others analyse issues between North America and Latin America. Regarding international migration, Turchick Hakak et al. (2010) look at the experiences of ECRs of Latin American origin who have moved to Canada. Tabb and Valdovinos (2019) describe a doctoral training experience that takes place between North America and South America.

An issue emerging from the study of ECRs at the national level is that countries become taken-for-granted, with research practices largely understood as activities that are produced within and on behalf of specific national contexts, and not considered as part of the social issue under examination. This form of methodological nationalism (Shahjahan and Kezar 2013) is implicit in this group of articles, as they assume that the development of academic research unfolds as a national endeavour. This perspective supposes that single countries constitute the ‘natural’ containers of scientific activity, and not social systems that structure, and become structured by social life in different contexts. In Latin America as anywhere else, scientific and technological achievements are commonly framed as national developments, which is a tendency that became prominent since the aftermath of the Second World War (Krige 2019). There is, of course, a celebratory element behind this approach, but there is also a failure to notice that scholarly activity relies to a great extent on the transnational circulation of information, people’s ability to travel and the development of networks that intersect the local and the global.

Conceptual issues

We see two main issues. First, only seven out of 101 articles explicitly elaborate theoretical frameworks – and these are wide-ranging. Tabb and Valdovinos (2019) use *intersectionality* as a theoretical lens to examine the experience of health services research in a South American programme. Turchick Hakak et al. (2010) develop their analyses from the perspective of *social networks*; Contreras Camargo and Bustos Aguayo (2018) use Wenger's theorisation of *social learning*; Durso et al. (2016) employ *self-determination theory*; Sacco et al. (2018) utilise *applied psychoanalytic approaches*; González-Moreno (2012) employ *expectancy-value* theory; and Mamede and Abbad (2018) apply *Bloom's taxonomy*.

While these few articles detail the links between their conceptual and empirical discussions, in fact, 94 of the 101 are not conceptually framed, providing empirical evidence with little theoretical elaboration. These articles concentrate on distinct realms of social activity, namely: the growth of higher education systems at the macro-level; dynamics concerning the development of particular disciplines, indicators of academic productivity or evaluation of programmes at the meso-level; or motivations for international mobility at the micro- and macro- levels. In doing so, these studies provide a fragmentary view of the social contexts in which ECRs in Latin America and the Caribbean develop their careers. Finally, the articles do not provide a stance or standpoint for future studies to build on.

The second conceptual issue is that even those using a conceptual framework do not consider the interplay between individual factors, particularly agency, and the different social contexts in which ECRs' careers develop. This perspective overlooks the scales at which the structural factors, institutional dynamics, everyday practices, relationships or individual experiences take place. Yet, the careers literature, as noted earlier, makes it clear that such a stance is critical to understanding career trajectories (McAlpine and Amundsen 2016, 2018). Therefore, much remains to be elaborated regarding the conceptualisation, theorisation and empirical examination of ECRs' in Latin America and the Caribbean.

TOWARDS AN ENCOMPASSING UNDERSTANDING OF ECRs

The results of our analysis provide a foundation for future research that seeks to provide a more thorough understanding of ECRs in this region. In our view, such research needs to integrate three different standpoints. The first is a recognition of the notion of ECRs that involves a rich and nuanced characterisation of the different contexts in which their career trajectories unfold and that captures the considerable variation within the group. The second includes strong theoretical approaches that address the intersection between individuals as actors (with lives beyond their

work) and the structural contexts that influence their career trajectories. The third is a broader use of methods that are driven by the research questions being addressed.

While the social study of science has had a relevant development in Latin America and the Caribbean in recent decades, this interdisciplinary field has not explicitly studied the particular issues faced by ECRs. The notion of ECRs as a category of analysis is well developed (though not always agreed upon) in the international literature, and needs to be constructed as a concept to analyse the particular circumstances in this region. Furthermore, in addressing the challenges of understanding who ECRs are, it is necessary to develop clear descriptions of the terms used so that regional and international comparisons are possible. For instance, given the structural contexts, should researchers with a Master's degree who are employed as academics be analysed as ECRs? Should those who work outside academia also be included given the concern regarding the lack of academic positions?

A theoretical approach that addresses the intersection between individuals as actors (with lives beyond their work) and the structural contexts that influence their career trajectories means that engaging with ECRs is crucial. This review demonstrates that we know literally nothing of the ways in which personal factors, both life and career, influence ECRs negotiation of structural factors. Yet, studies in the Global North (e.g., Thiry et al. 2015) as well as Africa (McAlpine et al., in press) demonstrate that such factors powerfully influence career trajectories. Issues such as personal well-being, having a chronic illness, changes in family responsibilities and priorities, life goals, personal values, and financial duress and insecurity need to be understood in relation to multiple, overlapping social contexts.

Finally, a research-driven – rather than opportunistic – use of data collection methods and analysis is necessary to generate a clearer picture of the career trajectories of ECRs. Such an approach would require using a wider variety of research strategies to capture different social contexts and their relationships. For instance, looking at the socio-structural dynamics through administrative data and national databases can help us to understand certain dynamics in the production, dissemination and appropriation of knowledge. But such an understanding needs to dialogue with other dimensions of the social – for instance, with fine-grained studies that look at the everyday practices among ECRs and the environments in which such knowledge production activities unfold. In particular, we need studies that are longitudinal so they can document the mobility patterns among ECRs in this region – both the structural and individual factors that lead to a range of different short-, mid- and long-term internal and external movements. In sum, a more comprehensive view on this issue can be achieved through debates on the meaning of ECRs, along with theoretical frameworks that address the intersection of individual and structural factors, combined with a broader repertoire of methodological approaches.

CONCLUSION

This article has sought to reveal how ECRs in Latin America have been studied in the scholarly literature. In outlining a research agenda, we aim to create intellectual interest and stimulate broader debates about this issue. There is much to be learnt, as ECRs in this region are yet to be identified as subjects of study in their own right. Since the current circumstances among ECRs tend to be precarious in most regions of the world, it is critical to develop novel ways to conceptualise and empirically investigate their trajectories. We hope that our analysis stimulates the interest of researchers and research funders in ECRs in Latin America and the Caribbean, as research in this area would have significant implications for the design of PhD programmes and those involved in them. Such results would also help PhD graduates to be better prepared for their futures.

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APPENDIX 1

List of the 101 articles reviewed

Authors	Year	Title	Journal	Country	Method	Data	Discipline	Theme	Nested context
Acosta and Celis	2014	The emergence of doctoral programmes in the Colombian higher education system: Trends and challenges	Prospects, 44, 463-481	Colombia	qualitative	Documents	ALL	Changes in higher education systems	Macro
Arce Miyaki and Gomis Hernández	2019	Las cátedras CONACYT en los márgenes de la subcontratación y la flexibilidad laboral	Nóesis. Revista de Ciencias Sociales y Humanidades, 28(55-1), 1-22	Mexico	qualitative	Interviews	ALL	PhD graduate job insecurity	Micro, meso
Baeza	2017	Diversidad y diferenciación en la oferta de programas de doctorada en Chile	Calidad en la Educación, 47, 179-214	Chile	quantitative	Documents	ALL	Changes in higher education systems	Meso
Balbuena et al.	2019	Explorando la posibilidad de implementar un posgrado de turismo en Loja (Ecuador)	Revista Espacios, 40(26)	Ecuador	mixed	Survey, interviews	SS	Development of specific disciplines	Micro, Meso
Bartolini and Gerlo	2017	Reflexiones sobre experiencias de abandono de escuela secundaria y doctorado en Argentina. Modos de cierre y condicionantes individuales e institucionales	Universitas Humanística, 83, 85-108	Argentina	qualitative	Documents	ALL	Efficiency of higher education programmes	Meso
Beltrão and Mandarinó	2014	Evidências do ENADE – mudanças no perfil do matemático graduado	Ensaio: Avaliação e Políticas Públicas em Educação, 22(84), 733-754	Brazil	quantitative	Administrative data	STEMM	Labour market insertion post-graduation	Meso
Bin et al.	2015a	Employment, research performance and decentralization: The experience and perspectives of doctorate holders in Brazil	Science and Public Policy, 42(2015), 646-660	Brazil	quantitative	Survey	ALL	Characterisation of programmes	Meso
Bin et al.	2015b	What difference does it make? Impact of peer-reviewed scholarships on scientific production	Scientometrics, 201, 1167-1188	Brazil	quantitative	National databases	ALL	Characterisation of programmes	Macro
Brock et al.	2010	Graduates from a postgraduate program in cardiology: Are the results of almost 30 years adequate?	Arquivos Brasileiros de Cardiologia, 94(4), 471-476	Brazil	quantitative	National databases, survey	STEMM	Development of specific disciplines	Meso

Casali and De Mattos	2015	Análise de estudos e pesquisas sobre o sentido social do programa Universidade para Todos (PROUNI)	Ensaio: Avaliação e Políticas Públicas em Educação, 23(88), 681-716	Brazil	qualitative	Documents	ALL	Characterisation of programmes	Meso
Cassiani et al.	2017	The situation of nursing education in Latin America and the Caribbean towards universal health	Revista Latino-Americana de Enfermagem, 25, e2913	LAC	quantitative	Survey	STEMM	Development of specific disciplines	Macro
Celis and Duque	2016	Factors shaping engineering PhD students' career preferences for academia y [sic!] industry [Factores que configuran las preferencias de empleo de los estudiantes de doctorado en ingeniería por la academia y la industria]	Investigación & Desarrollo, 24(2), 355-385	Colombia	quantitative	Survey	STEMM	Influences on participation in graduate programs	Micro, meso
Celis Giraldo and Héndez Puerto	2018	Employment preferences for PhD students in Engineering [Preferencias de empleo de las estudiantes de doctorado en Ingeniería]	Diversitas: Perspectivas en Psicología, 14(2), 321-337	Colombia	quantitative	Survey	STEMM	Influences on participation in graduate programs; Gender and diversity	Micro, meso
Celis-Giraldo and Duque-Escobar	2014	A Comparative Study of Professional Preferences Among Engineering Ph.D. Colombia USA [Estudio comparado sobre preferencias profesionales de doctorados en ingeniería. Colombia-Estados Unidos]	Educación y Educadores, 17(2), 306-320	Colombia, USA	quantitative	Survey	STEMM	Labour market insertion post-graduation	Micro, meso
Chávez Elorza and Alfaro	2018	Professional trajectories of the qualified Mexican diaspora [Trayectorias profesionales de la diáspora mexicana calificada]	Sociedad y Economía, 34, 51-73	Mexico	quantitative	Survey	ALL	International mobility	Micro, meso
Chiappa and Muñoz García	2015	Equidad y capital humano avanzado: Análisis sobre las políticas de formación de doctorado en Chile	Psicoperspectivas, 14(3), 17-30	Chile	qualitative	Interviews, focus groups	ALL	Changes in higher education systems	Meso
Contreras Camargo and Bustos Aguayo	2018	Reconciliation of different trajectories on the identity of Master's students in environmental education	Quaderns de Psicologia, 20(1), 37-51	Mexico	qualitative	Interviews	SS	Gender and diversity	Micro
Corvalán et al.	2011	El doctorado en educación: Un ejemplo de desregulación en el campo de la educación superior en Chile	Calidad en la Educación, 34, 15-42	Chile	qualitative	Interviews	SS	Changes in higher education systems	Meso
Cunha et al.	2014	Success in publication by graduate students in psychiatry in Brazil: an empirical evaluation of the relative influence of English proficiency and advisor expertise	BMC Medical Education, 14(238), 1-8	Brazil	quantitative	Survey	STEMM	Academic productivity	Micro, meso

Da Silva and Alves	2018	As aspirações dos aprendizes: Doutorandos em educação no Brasil	Cadernos de Pesquisa, 48(167), 280-308	Brazil	quantitative	Survey	SS	Development of specific disciplines	Meso
Daza and Ladino	2018	Nursing: Normal Research or Revolutionary Research? [Enfermería: ¿Ciencia Normal o Ciencia Revolucionaria?]	Enfermería Universitaria, 15(2), 184-198	Colombia	qualitative	Documents	STEMM	Development of specific disciplines	Meso
De Castro et al.	2013	Pós-doutorado, essencial ou opcional? Uma radiografia crítica no que diz respeito às contribuições para a produção científica	Avaliação, Campinas, 18(3), 773-801	Brazil	quantitative	National databases	STEMM	Changes in higher education systems	Meso
De Melo et al.	2018	Determination of the factors contributing to graduate students' satisfaction: a case study from Brazil	International Journal of Engineering Education, 34(2A), 1-11	Brazil	quantitative	National databases	STEMM	Changes in higher education systems	Macro
De Melo et al.	2019	As vozes dos estudantes universitários com deficiência nas instituições públicas de ensino superior no Brasil e em Portugal (2008 - 2015)	Revista Iberoamericana de Educación Superior, 10(28), 42-65	Brazil, Portugal	qualitative	Documents	ALL	Gender and diversity	Meso
De Souza et al.	2014	"I'd like to learn to be a teacher": On the training of masters in graduate programs in the field of Food and Nutrition in Brazil ["Eu queria aprender a ser docente": sobre a formação de mestres nos programas de pós-graduação do campo da Alimentação e Nutrição no Brasil]	Revista de Nutrição, 27(6), 725-734	Brazil	qualitative	Questionnaire	STEMM	Development of specific disciplines	Meso
Dias-Neto et al.	2015	Software engineering research in Brazil from the perspective of young researchers: a panorama of the last decade	Journal of the Brazilian Computer Society, 21(14), 1-17	Brazil	quantitative	Survey	STEMM	Academic productivity	Meso, macro
Difabio de Anglat et al.	2018	The experience of educational research at doctoral level in the region of Cuyo, Argentina [La experiencia de investigación educativa de nivel doctoral en la región de Cuyo, Argentina]	Revista de Docencia Universitaria, 16(1), 11-32	Argentina	qualitative	Questionnaire	SS	Development of specific disciplines	Micro; meso
Durso et al.	2016	Motivational factors for the Master's degree: A comparison between students in accounting and economics in the light of the self-determination theory	Revista Contabilidade & Finanças, 27(71), 243-258	Brazil	quantitative	Survey	SS	Influences on participation in graduate programs	Micro
Falaster et al.	2016	The research productivity of new Brazilian PhDs in management	Management Research: The Journal of the Iberoamerican Academy of Management, 14(1), 60-84	Brazil	quantitative	National databases	SS	Academic productivity	Meso, macro

Farfallini et al.	2018	Building a practice research network of young therapists and in Spanish speaking countries: Why, who and how [Construyendo una red de investigación orientada por la práctica de jóvenes terapeutas e investigadores en países de habla hispana: Por qué, quiénes y cómo]	Revista Argentina de Clínica Psicológica, 27(2), 203-228	Argentina	quantitative	Survey	SS	Development of specific disciplines	Micro, meso
Farji-Brener and Ruggiero	2010	¿Impulsividad o paciencia? Qué estimula y qué selecciona el sistema científico argentino	Ecología Austral, 20, 307-314	Argentina	quantitative	Survey	ALL	Academic productivity	Micro, meso
Faro	2013b	Estresse e Estressores na Pós-Graduação: Estudo com Mestrands e Doutorandos no Brasil	Psicologia: Teoria e Pesquisa, 29(1), 51-60	Brazil	quantitative	Survey	ALL	Influences on participation in graduate programs	Meso
Faro	2013a	An Explanatory Model for Subjective Well-Being: A Study with Masters and PhD Students in Brazil [Um Modelo Explicativo para o Bem-Estar Subjetivo: Estudo com Mestrands e Doutorandos no Brasil]	Psicologia: Reflexão e Crítica, 26(4), 654-662	Brazil	quantitative	Survey	ALL	Influences on participation in graduate programs	Meso
Ferreira	2015	Professional master and its challenges	Revista do Colegio Brasileiro de Cirurgiões, 42(1), 9-13	Brazil	quantitative	National databases	STEMM	Development of specific disciplines	Meso
Ferreira and Tavares	2013	Motivation of nurses to undergo a Master's Program: a descriptive study	Online Brazilian Journal of Nursing, 12, 734-736	Brazil	qualitative	Questionnaire, interviews	STEMM	Influences on participation in graduate programs	Micro
Flores Osorio	2018	Challenges and contradictions at the training the Researchers in Mexico [Retos y contradicciones de la formación de investigadores en México]	Educar em Revista, Curitiba, 34(71), 35-49	Mexico	qualitative	Fieldnotes	SS	Changes in higher education systems	Meso
Freidenberg and Malamud	2013	Politólogos on the run: contrasting paths to internationalization of Southern Cone Political Scientists	Latin American Politics and Society, 55(1), 1-21	AR, Brazil, Chile, Paraguay, Uruguay	quantitative	Survey	SS	International mobility	Micro, macro
Gómez Nashiki et al.	2014	Publicar en revistas científicas, recomendaciones de investigadores de ciencias sociales y humanidades	Revista Mexicana de Investigación Educativa, 19(60), 155-185	Mexico	qualitative	Interviews, documents	SS, H	Academic productivity	Micro
Goncalves et al.	2014	Scientific Research in Pediatrics Produced at the CNPq [Produção Científica dos Pesquisadores da Área de Pediatria no CNPq]	Revista Brasileira de Educação Médica, 38(3), 349-355	Brazil	quantitative	National databases	STEMM	Academic productivity	Meso

Gonzalez and Jiménez	2014	Occupational Insertion of New PhD Researchers in Chile [Inserción Laboral de Nuevos Investigadores con Grado de Doctor en Chile]	Journal of Technology Management & Innovation, 9(4), 132-148	Chile	quantitative	Documents	ALL	Labour market insertion post-graduation	Meso
González-Moreno	2012	Student motivation in graduate music programmes: an examination of personal and environmental factors	Music Education Research, 14(1), 79-102	Mexico	quantitative	Survey	H	Efficiency of higher education programmes; Influences on participation in graduate programs	Macro
Grijalva Verdugo and Urrea Zazueta	2017	Scientific Culture from the University. Research Competence Evaluation of Students Enrolled in the Summer Science Programs [Cultura científica desde la universidad. Evaluación de la competencia investigativa en estudiantes de Verano Científico]	Education in the Knowledge Society, 18(3), 15-35	Mexico	quantitative	Survey	ALL	Characterisation of programmes	Micro, meso
Grossi et al.	2016	As mulheres praticando ciência no Brasil	Estudos Feministas, 24(1), 11-30	Brazil	quantitative	National databases	ALL	Gender and diversity	Meso
Guzmán et al.	2019	Factors affecting the propensity of academic researchers in Mexico to become inventors and their productivity	Contaduría y Administración, 64(1), 1-24	Mexico	quantitative	National databases	STEMM	Academic productivity	Micro, meso
Helene and Ribeiro	2011	Brazilian scientific production, financial support, established investigators and doctoral graduates	Scientometrics, 89, 677-686	Brazil	quantitative	National databases	ALL	PhD and PhD-graduate funding; Changes in higher education systems	Macro
Hernández et al.	2012	Graduates Follow-Up in Three Master Degree Programs at the National Polytechnic Institute in Mexico [Seguimiento de Egresados en Tres Programas de Maestría en una Escuela del Instituto Politécnico Nacional en México]	Formación Universitaria, 5(2), 41-52	Mexico	quantitative	Survey	SS, STEMM	Academic productivity	Micro, meso
Hitner and Tapia López	2018	Public policies for the return of qualified human talent in Ecuador and its international insertion: the case of PhD scholars [Políticas públicas de retorno del talento humano calificado de Ecuador y su inserción internacional: el caso de los becarios de doctorado]	Universitas. Revista de Ciencias Sociales y Humanas, 29, 109-132	Ecuador	quantitative	Survey, administrative data	ALL	Labour market insertion post-graduation	Meso

Hortale et al.	2010	Characteristics and limits of Professional Master in the Health area: study with alumni from Oswaldo Cruz Foundation [Características e limites do mestrado profissional na área da Saúde: estudo com egressos da Fundação Oswaldo Cruz]	Ciência & Saúde Coletiva, 15(4), 2051-2058	Brazil	qualitative	Interviews	STEMM	Changes in higher education systems	Micro; meso
Jiménez-Vásquez	2014	Trayectorias profesionales de egresados del Doctorado en Educación de la Universidad Autónoma de Tlaxcala. Un análisis de las funciones, productividad y movilidad en el mercado académico	Perfiles Educativos, 36(143), 30-48	Mexico	quantitative	Survey	SS	Labour market insertion post-graduation	Meso
Justiniano Domínguez	2019	Professional trajectories of Master's students in education: An analysis of expectations and transition	Educar, 55(2), 419-434	Bolivia	quantitative	Survey	SS	Development of specific disciplines	Micro
Koetz et al.	2013	Quality of life of professors of higher education community institutions in the state of Rio Grande do Sul, Brazil [Qualidade de vida de professores de Instituições de Ensino Superior Comunitárias do Rio Grande do Sul]	Ciência & Saúde Coletiva, 18(4), 1019-1028	Brazil	quantitative	Survey	ALL	Influences on participation in graduate programs	Micro
López et al.	2018	Aplicación de políticas de aseguramiento de la calidad en programas doctorales	Opción, 34(86), 71-102	Chile	qualitative	Documents	ALL	International mobility	Meso
López Ramírez	2015	La decisión de estudiar el doctorado en México o en el extranjero: ¿determinación social, herencia de rutas académicas o construcción de destinos?	Estudios Sociológicos, 33(98), 429-446	Mexico	qualitative	Interviews	STEMM	International mobility	Micro, meso
Mamede and Abbad	2018	Educational goals in a professional master degree in Public Health: assessment according Bloom's Taxonomy [Objetivos educacionais de um mestrado profissional em saúde coletiva: avaliação conforme a taxonomia de Bloom]	Educação e Pesquisa, 44, e169805	Brazil	qualitative	Documents	STEMM	Characterisation of programmes	Meso
Manterola et al.	2016	Initial results of a Doctorate in Medical Sciences Program at a regional university	International Journal of Morphology, 34(3), 1169-1175	Chile	quantitative	Administrative data	STEMM	Academic productivity	Meso
Marengo	2014	The Three Achilles' Heels of Brazilian Political Science	Brazilian Political Science Review, 8(3), 3-38	Brazil	quantitative	National databases	SS	Development of specific disciplines	Macro
Marengo	2019	Political Science as a vocation. Professionalization of political science PhDs in Brazil, 1996-2014 [Ciência Política como vocação. Profissionalização de doutores em Ciência Política no Brasil, 1996-2014]	Citivas, 19(3), 523-544	Brazil	quantitative	National databases	SS	Development of specific disciplines	Meso

Marmolejo-Leyva et al.	2015	Mobility and international collaboration: case of the Mexican scientific diaspora	PLoS ONE, 10(6), e0126720	Mexico	quantitative	National databases	ALL	International mobility	Macro
Martínez Rodríguez and Solís Cabrera	2013	Information science research via graduate education in Cuba up to the year 2010	Revista Cubana de Información en Ciencias de la Salud, 24(4), 456-471	CU	quantitative	Documents	STEMM	Development of specific disciplines	Meso
Martins Teixeira and Almeda Freitas	2015	Academic and professional features about scientific women on physics and physical education [Aspectos acadêmicos e profissionais sobre mulheres cientistas na física e na educação física]	Revista Ártemis, 20, 57-65	Brazil	quantitative	National databases	STEMM	Gender and diversity	Meso
Mejia et al.	2017	Baja publicación en revistas científicas de médicos peruanos con doctorado o maestría: Frecuencia y características asociadas	Educación Médica, 19(2), 135-141	Peru	quantitative	Documents	STEMM	Academic productivity	Meso
Mendes and Figueira	2019	Women's scientific participation in Political Science and International Relations in Brazil	Revista Estudos Feministas, Florianópolis, 27(2), e54033	Brazil	quantitative	National databases	SS	Gender and diversity	Macro
Mendes et al.	2010	Profile of Medical Researchers with Scientific Productivity Grants from the Brazilian National Research Council (CNPq) [Perfil dos Pesquisadores Bolsistas de Produtividade Científica em Medicina no CNPq, Brasil]	Revista Brasileira de Educação Médica, 34(4), 535-541	Brazil	quantitative	National databases	STEMM	Development of specific disciplines	Meso
Mendonça Neto et al.	2011	Os periódicos de maior impacto na pesquisa contábil brasileira e norte-americana: Uma análise comparativa baseada nas citações em teses de doutorado	Perspectivas em Ciência da Informação, 16(3), 93-115	Brazil	quantitative	Documents	SS	Development of specific disciplines	Meso
Molina Fuentes	2016	Indigenous Intellectuals in Academic Jobs in Mexico. Ex-Fellows of the International Fellowship Program [Inserción laboral en espacios académicos de intelectuales indígenas en México. Ex becarios del International Fellowships Program]	Revista Iberoamericana de Educación, 72(1), 69-88	Mexico	qualitative	Interviews	ALL	Labour market insertion post-graduation; Gender and diversity	Micro, meso
Montalvo-Javé et al.	2016	Importancia de la maestría y el doctorado en cirugía general	Cirugía y Cirujanos, 84(2), 180-185	Mexico	qualitative	Documents	STEMM	Development of specific disciplines	Meso
Moreno	2016	Sobre las diferencias salariales y la atomización de los agentes en la migración calificada	Ciencia, Docencia y Tecnología, 27(53), 1-32	Argentina	qualitative	Interviews	STEMM	International mobility	Micro, meso

Morosini and Nascimento	2017	Internationalization of higher education in Brazil: Recent production in Master theses and PhD dissertations [Internacionalização da educação superior no Brasil: A produção recente em teses e dissertações]	Educação em Revista, Belo Horizonte, 33, e155071	Brazil	quantitative	National databases	ALL	Changes in higher education systems	Meso
Nascimento Nganga et al.	2016	Master's and Doctoral Degree Programs to Train Accounting Professors in Brazil: An Analysis of the Pedagogical Components of their Initial Training [Mestres e Doutores em Contabilidade no Brasil: Uma Análise dos Componentes Pedagógicos de sua Formação Inicial]	Revista Iberoamericana sobre Calidad, Eficacia y Cambio en Educación, 14(1), 83-99	Brazil	quantitative	National databases	SS	Development of specific disciplines	Meso
Nascimento and Beuren	2011	Social Networks in the Scientific Production of Postgraduate Programs of Accounting Sciences in Brazil [Redes Sociais na Produção Científica dos Programas de PósGraduação de Ciências Contábeis do Brasil]	Revista de Administração Contemporânea, 15(1), 47-66	Brazil	quantitative	National databases	SS	Changes in higher education systems	Meso
Nepomuceno and Costa	2012	Perceptions mapping of the impacts of professional Master's programs in the profile of their alumni	Produção, 22(4), 865-879	Brazil	quantitative	Survey	ALL	Characterisation of programmes	Meso
Noormahomed et al.	2019	The evolution of mentorship capacity development in low- and middle-income countries: case studies from Peru, Kenya, India, and Mozambique	The American Journal of Tropical Medicine and Hygiene, 100(1), 29-35	Peru	qualitative	Questionnaire	DIS	Mentorship	Meso, macro
Núñez-Valdés et al.	2019	Expectations of the Chilean Doctoral Students: Inputs for the Preparation of a Doctoral Graduate Profile [Expectativas de los Doctorandos Chilenos: Insumos para la Elaboración de un Perfil de Egreso Doctoral]	Formación Universitaria, 12(5), 3-14	Chile	quantitative	Survey	SS	Influences on participation in graduate programs	Meso
Olinto et al.	2011	Human resources, research and scientific production of Brazilian Graduate Programs in Nutrition, 2007-2009 [Formação humana, pesquisa e produção científica na subárea de avaliação "nutrição" da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, no Brasil, de 2007 a 2009]	Revista de Nutrição, 24(6), 917-925	Brazil	quantitative	National databases	STEMM	Development of specific disciplines	Meso
Oliveira et al.	2014	Profile and scientific production of the Brazilian Council for Scientific and Technological Development (CNPq) researchers in the field of Hematology/Oncology	Revista de Associação Médica Brasileira, 60(6), 542-547	Brazil	quantitative	Documents	STEMM	Development of specific disciplines	Meso

Ortiz and Mendoza	2016	Jóvenes doctorandos europeos y latinoamericanos en Barcelona: Experiencias migratorias y vivencias en la ciudad	Finisterra - Revista Portuguesa de Geografia, 102, 81-101	Spain (students from LAC)	qualitative	Interviews	DIS	International mobility	Micro
Ortiz Acle et al.	2018	Effect of educational policies on the training of researchers in federal doctoral programs in administrative sciences in Mexico [Efecto de las políticas educativas en la formación de investigadores en los programas federales de doctorado en ciencias administrativas en México]	Revista Iberoamericana para la Investigación y el Desarrollo Educativo, 9(17)	Mexico	qualitative	Interviews	SS	Changes in higher education systems	Micro; meso; macro
Ortiz-Torres	2019	La calidad en la formación de doctores en Ciencias Pedagógicas: una evaluación desde sus egresados y propuestas de mejora	Revista Educación, 43(1), 1-15	Cuba	qualitative	Questionnaire	SS	Academic productivity	Micro, meso
Perdomo and Valera	2010	Analysis of trends among young researchers in Venezuela	Revista de Ciencias Sociales, 16(2), 239-249	Venezuela	quantitative	National databases	ALL	Changes in higher education systems	Meso
Pinto et al.	2014	Scholarships for scientific initiation encourage Post-Graduation Degree	Brazilian Dental Journal, 25(1), 63-68	Brazil	quantitative	Survey	STEMM	PhD and PhD-graduate funding	Micro, macro
Ramos and Hayashi	2019	Inventory of theses and dissertations on the education of deaf theme (2010-2014) [Balanço das Dissertações e Teses sobre o Tema Educação de Surdos (2010-2014)]	Revista Brasileira de Educação Especial, 25(1), 115-130	Brazil	quantitative	Documents	SS	Development of specific disciplines	Macro
Ramos and Velho	2013	Formação de doutores no Brasil: O esgotamento do modelo vigente frente aos desafios colocados pela emergência do sistema global de ciência	Avaliação, Campinas, 18(1), 219-246	Brazil	quantitative	Administrative data	ALL	Changes in higher education systems	Macro
Ramos and Velho	2011	Doctoral training in Brazil and abroad: Impacts on the propensity to migrate [Formação de doutores no Brasil e no exterior: Impactos na propensão a migrar]	Educação & Sociedade, 32(117), 933-951	Brazil	quantitative	National databases	ALL	International mobility	Meso
Ramos et al.	2010	Formation of masters in nursing at the Universidade Federal de Santa Catarina: contributions under post graduates' view [Formação de mestres em enfermagem na Universidade Federal de Santa Catarina: contribuições sob a ótica de egressos]	Revista Brasileira de Enfermagem, 63(3), 359-365	Brazil	qualitative	Questionnaire	STEMM	Characterisation of programmes	Micro, meso

Ríos et al.	2011	The construction of inequality in the job market of the researchers in Mexico [La construcción de desigualdades en el mercado de trabajo de los investigadores en México]	Avaliação, Campinas, 16(1), 73-97	Mexico	quantitative	National databases	ALL	PhD graduate job insecurity	Meso
Rivero et al.	2017	Impacto de la educación formal de postgrado en Management: Análisis de las transiciones de carrera de los graduados de un Master of Business Administration	Innovar, 27(63), 107-124	Argentina	qualitative	Interviews	SS	Labour market insertion post-graduation	Micro, meso
Roos et al.	2014	Brazilian scientific production in areas of biological sciences: a comparative study on the modalities of full doctorate in Brazil or abroad	Scientometrics, 98, 415-427	Brazil	quantitative	National databases	STEMM	Changes in higher education systems	Macro
Ruchkys et al.	2017	A historical and statistical analysis of the brazilian academic production, on Master's and PhD level, on the following subjects: Geodiversity, geological heritage, geotourism, geoconservation and geoparks	Anuário do Instituto de Geociências, 40(1), 180-190	Brazil	quantitative	National databases	STEMM	Development of specific disciplines	Meso
Rueda Ortíz and Ríos García	2016	Doctorate studies in social sciences: epistemologies and policies of inclusion [Doctorados en ciencias sociales: epistemologías y políticas de inclusión]	Nómadas, 44, 45-63	Colombia	qualitative	Interviews	SS	Development of specific disciplines	Meso
Sacco et al.	2018	Building bridges between Puerto Rican psychology students and Massachusetts mental health clinics: analysis of a workforce crisis	International Journal of Applied Psychoanalytic Studies, 15(1), 52-60	Puerto Rico, USA	qualitative	Interviews	SS	International mobility	Micro
Santos Padrón et al.	2018	Performance of students graduated from the Doctoral Program of Health Sciences in Tabasco, México [Desempeño de egresados del Doctorado en Ciencias de la Salud en Tabasco, México]	Revista Cubana de Educación Médica Superior, 32(2)	Mexico	quantitative	Survey	STEMM	Academic productivity	Meso
Silva et al.	2020	Profile of health professionals who completed a Master's, doctoral, or post-doctoral degree in one Brazilian pediatric program	CLINICS, 75, e1392	Brazil	quantitative	Survey	STEMM	Labour market insertion post-graduation	Micro, macro
Sito and Kleiman	2017	"Eso no es lo mío": un análisis de conflictos en la apropiación de prácticas de literacidad académica	Universitas Humanística, 83, 159-185	Brazil, Colombia	qualitative	Interviews	ALL	Gender and diversity	Meso
Spinzi Blanco et al.	2015	A investigar se aprende investigando. Programa de jóvenes investigadores	Sinética, 44, 1-11	Paraguay	qualitative	Focus groups	SS	Characterisation of programmes	Meso

Tabb and Valdovinos	2019	Experiencing health services research in the Global South: a collaborative autoethnography of two social work researchers	Global Social Welfare, 6, 189-198	Canada, LAC	qualitative	Fieldnotes	STEMM	Gender and diversity	Macro
Tarapuez-Chamorro et al.	2018	Sociodemographic and family aspects and entrepreneurial intention among Master of Business Administration students in Colombia [Aspectos sociodemográficos y familiares e intención empresarial en estudiantes de Maestría en Administración en Colombia]	Estudios Gerenciales, 34(149), 422-434	Colombia	quantitative	Survey	SS	Labour market insertion post-graduation	Micro
Tuesta et al.	2015	Analysis of an advisor-advisee relationship: an exploratory study of the area of Exact and Earth Sciences in Brazil	PLoS ONE, 10(5), e0129065	Brazil	quantitative	National databases	STEMM	Mentorship	Macro
Turchick Hakak et al.	2010	Barriers and paths to success: Latin American MBAs' views of employment in Canada	Journal of Managerial Psychology, 25(2), 159-176	Canada, LAC	qualitative	Interviews	SS	International mobility	Micro
Unzué and Rovelli	2017	Changes, trends and challenges of the recent scientific policies in Argentinian National Universities [Cambios, tendencias y desafíos de las políticas científicas recientes en las universidades nacionales de Argentina]	Tla-melaua, 11(42), 242-261	Argentina	qualitative	Interviews	ALL	Changes in higher education systems	Meso
Wainerman and Matovich	2016	Data and Performativity in Doctoral Education: Information Gaps and Suggestions for Overcoming Theme	Education Policy Analysis Archives, 24(124), 1-22	Argentina	quantitative	Administrative data	ALL	Efficiency of higher education programmes	Meso
Zapata-Sepúlveda et al.	2016	The traveling researchers' sisterhood: four female voices from Latin America in a collaborative autoethnography	Qualitative Research Journal, 16(3), 251-262	LAC	qualitative	Fieldnotes	DIS	Gender and diversity	Micro

APPENDIX 2

List of countries considered in our search for literature

Anguilla

Antigua and Barbuda

Argentina

Aruba

Bahamas

Barbados

Belize

Bolivia

Brazil

British Virgin Islands

Cayman Islands

Caribbean Netherlands

Chile

Colombia

Costa Rica

Cuba

Curacao

Dominica

Dominican Republic

Ecuador

El Salvador

Falkland Islands

French Guiana

Grenada

Guadeloupe

Guatemala
Guyana
Haiti
Honduras
Jamaica
Martinique
Mexico
Montserrat
Nicaragua
Panama
Paraguay
Peru
Puerto Rico
Saint Lucia
Saint Kitts & Nevis
Sint Maarten
St. Vincent & Grenadines
Suriname
Trinidad and Tobago
Turks and Caicos
Uruguay
US/U.S./United States Virgin Islands
Venezuela

Total: 48