Mapping the field: a bibliometric analysis for Distance Education with a focus on Management Studies

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Abstract

The pandemic context has presented new challenges for education. In a short time, higher education institutions (HEIs) adapted their students, staff, technology, and infrastructures for a fast migration to distance learning. This change brought new challenges but also new opportunities that justify more contributions. The purpose of this paper is to study distance education (DE) methods and approaches, with a focus on management studies that are understudied. The research adopted a descriptive quantitative approach. Based on a sample of 400 documents using the Scopus database, a bibliometric analysis was carried out, aiming to identify the most prominent keywords, authors, sources, and countries for DE in general, with a focus on management courses in HEIs. The results suggest that innovation can be an asset for HEIs and can be seen as an ally for both teachers and students in learning new practices that involve digitalization. The bibliometric analysis highlights that motivation and collaboration are very important aspects and should be considered, especially when students are at the center of the teaching process. The main limitation regards the dominance of papers about DE, mostly based on the education sciences, and just a small number focusing on management courses. This limitation can influence the results achieved, but also allows this research to contribute for a better understanding of this field. This is one of few studies that has innovated by identifying the main subjects in DE literature, with a special emphasis on management courses, thus complementing previous scarce research in the field.

KEYWORDS: Bibliometrics, Distance Education, Management Courses, Higher Education, Covid-19.

1. Introduction

Distance Education (DE) is not a recent concept, although the pandemic situation of the Corona virus (Covid-19) has proven and evidenced its importance, in training and knowledge contexts of Higher Education Institutions (HEIs) centered on face-to-face teaching.

This has simultaneously brought a set of new challenges for the management of these HEIs, as well as for the adaptation of both teachers and students to this new teaching-learning model considering broad aspects such as technology, assessment systems, teaching strategies, among others. Moreover, in the context of HEIs offering management courses, DE is a particularly challenging teaching modality, especially in the initial period of the pandemic, in terms of contacts within applied research in co-creation, without an established protocol for action. However, mutual learning was also possible among the main actors involved in the process, in order to enable new practices that involve digitalization. According to Mukul and Büyüközkan (2023), technological development as part of Industry 4.0 has significantly changed the education system and there have been several implications for human life.

This study aims to present a quantitative analysis of publications on DE in higher education in the sense of opening to the scientific community a new look at the DE modality, now more than ever a priority modality in a pandemic context, and its potential after the pandemic; in addition, the aim is to fill the gap in the insufficient existing literature on this subject within higher education courses in the management area.

To meet these objectives, it is necessary to consider that the changing context of the pandemic brought to teaching the need to reinvent the teaching–learning process, using remote technologies such as digital platforms to meet the need for continuity of classes in a non-face-to-face format. From this perception, it is possible to find some terms referring to the distance learning modality that can be analyzed and interpreted, such as, for example, e-learning, remote learning, virtual learning, collaborative environment, among others. Considering the weighting of the terms in the theme under study and the requirement of a particular incidence on courses in the management area, some keywords are defined. From this step information available in a database can be used, in this case Scopus, and other dimensions of reference on the theme under study can be explored.

The next section of this paper is methodological in nature, describing the main steps and criteria in defining terms that are appropriate to the theme to be addressed. The purpose of this section is to create a framework to then carry out a literature review, presented in section three, and subsequently, in the fourth section, a bibliometric analysis supported by this literature review. Section 5 presents the final conclusions.

2. Methodology

This paper aims to analyze scientific publications on distance education (DE) in higher education, with a special focus on management courses. Thus, Scopus was used, because it allows more extensive bibliometric analyses, as there has been a content reload from other Elsevier databases since 1966 to increase and enrich coverage (Costa et al., 2012). The present study was also supported by Bibliometrix software, focusing on four different dimensions of bibliometrics: keywords, authors, sources, and countries. Two well-known authors who have written on this software program, Aria and Cuccurullo (2017), mention that Bibliometrix, besides being flexible, can easily integrate other statistical programs, thus reaching a large and active community of scholars and researchers.

Initially, it was necessary to find terms associated with the topic, such as "distance", "learning", "online," and, at the same time, to select the areas of study most familiar to the topic, such as "social science," "computer science," and "business, management, and accounting." Given the nature of the study, an important condition to implement in this process was to restrict the topic to "higher education", disregarding other academic levels. Other restriction criteria adopted were the type of document, type of source and period (the latter being verified through reading), which led to a final sample of 52 documents (Table 1). Based on that sample, a literature review was carried out, aiming to identify the main subjects in DE literature with a focus on management fields, complementing previous research in the matter (section 3).

Stage	Description	Pros	Cons
1	Choose clear and precise keywords in the multi-database engine	-	-
2	Choose a database that gathers the most reputed authors for the topic under study	-	As the databases have different profiles, the researcher must find the one that gathers the most authors and relevant journals available for the topic under study
3	Restrict the sub-areas linked to the theme (management)	The sub-areas are very precise	-
4	Filter only scientific articles, reviews, and journals	-	-
	Scopus database returns 332 publications		
5	Read the titles of the publications, detect repeated authors, and exclude or admit them, given some limitations	A careful reading helps to better define the issues addressed within the theme	There are articles published by more reputable authors that may be unavailable. It is also advisable to check that the article does not discretely "sidestep" the topic (false positives)
	Scopus database returns 52 publications		

Table 1 - Description of the steps on the articles intended for the literature review.

Given the weak manifestation of "peaks", which means that the number of articles would only be understandable for recent or little studied themes (which goes against the study in question since it gathers data beyond the turn of the century), a new search in Scopus was conducted. The focus was to reduce the number of terms, to expand the subject and, consequently, increase the number of publications within the focus. By filtering again for the same requirements as previously, even though ensuring the exclusion of false positives, a final sample of 400 documents was reached to carry out the bibliometric analysis presented in section 4 (Table 2). It should be noted that of the total of 400 articles, some are related to broader themes, such as social sciences (239) and computer science (82), while others are associated with management themes, such as business, management and accounting (17), economics, econometrics and finance (5), among others (Figure 1).
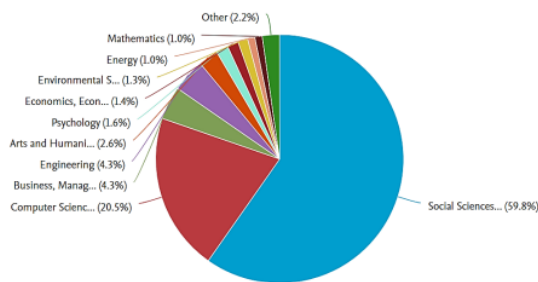

Figure 1 - Documents by subject area (source: Scopus 2021).

The authors' methodological choices are more precisely as follows. In order to make the scientific literature a line of confrontation of ideas and thoughts, it was necessary to identify some authors and, in this case, it was found that there are some highly regarded ones for the definition of distance education; however, they are not found in the Web of Science, only in Scopus, which proves that articles are reloaded into this database. The only types of articles included were scientific articles and, to a lesser extent, reviews, as these are the most rigorous and reliable materials. The choice of time period was based on the turn of the century and the year of the pandemic, more precisely, 20 years before and 20 years after the year 2000, which resulted in a period of 40 years. With regard to the choice of keywords, in the first phase, "direct" terms to the subject were used i.e., "distance", "education", "online", "learning", "higher" and "e-learning", linked with the additive particle "AND" ("distance" AND education" AND "online" AND "learning" AND "higher" AND "e-learning"), which generated 52 articles, after eliminating some "false positives" such as situations related to different levels of education and other areas of study. In a second phase, a new search was carried out, focusing on "distance education" AND "higher education".

The first 52 articles are written along the same lines and all the subjects are approached in a very similar way, differing only in each author's point of view. These 52 articles were read and analyzed "in depth" in order to obtain a coherent and objective literature review. The aim of increasing the number of articles - in this case, it was obtained 400 after the second search and after eliminating some "false positives" - was both to expand the subject and realize, with the support of Bibliometrix, whether the topics and authors of the first search were part of the second search and thus were still relevant. Some important authors can be named, namely: Moore (1990); Holmberg (1997); Garrison & Kanuka (2004); Bernard et al. (2004); Arbaugh et al. (2009); Abrami et al. (2011). These authors, as well as serving in the 52 publications mentioned, are also included in the final 400 publications, given their relevance. A further reason for generating a greater number of articles was to test the three fundamental

Stage	Description	Pros	Cons
	More articles are needed to make the bibliometric analysis more robust		
6	Do a new search in the Scopus search engine, but this time reduce the number of terms, in order to broaden the subject and consequently increase the number of publications	In this step it is not necessary to read and analyze, the only aim is to increase the number of publications	Naturally, it will include false positives
7	Re-filter the same requirements considered in Table 1	-	Filter further to ensure the exclusion of false positives
	The Scopus database returned 366 publications; the previous 52 were added and others were removed. The bibliometric review has 400 records in Bibliometrix		

Table 2 - Description of the steps on the articles for the bibliometric review.

laws of bibliometrics (i) Lotka's law; (ii) Bradford's law; (iii) Zipf's law.

3. Literature Review

3.1 Evolution of the concept of DE

There are several definitions of DE that attempt to explain this concept, presenting different views and perspectives on it. López-Pérez et al.'s (2011) definition of DE is possibly one of the most popular. The authors state that this is a teaching modality that allows individuals who are geographically separated to learn. Amidst definitions also come theories, namely the transactional distance theory formulated by Moore and Kearsley (2005), which stresses that distance is a pedagogical phenomenon and not just a matter of geographical distance.

DE differs from other modes of education. Thus, Anohina (2005), Bernard et al. (2004) and Keegan (1980) agree that in DE there is different lesson planning and preparation; the use of technical means connects teachers and students, and enhances content acquisition; and, finally, the provision of two-way means facilitates dialogue and interaction among all. From the perspective of Simonson et al. (2011), each form of technology linked to DE has advantages and disadvantages regarding the quality of the learning experience, and group collaboration and interaction may be more important than individual participation.

Theoretically, there is a natural conflict of interest between what is practical and what is efficient in the teaching-learning process. It is true that there are many appreciated conveniences in DE, such as the time factor, or comfort, but one must also take into consideration the implied drawbacks, such as the poor socialization and expectation of students who opt for a face-to-face course. According to Bonk (2020), sometimes there are not enough fully functioning technological resources and infrastructure, and in addition, some students may even have to share the Internet with family members or other people living in the same house, as well as the workspace.

For some, the lack of knowledge about the evolution of DE leads to it being easily equated with the term remote learning (Bonk, 2020). Moreover, Sun (2008) argues that students should be provided with instructional knowledge and technical assistance regarding e-learning in order to reduce uncertainty and frustration, thus leading to better learning experiences. In the same Vein, et al., (2010) points out that more time online means more work and less quality of life for everyone. Active approaches exist that allow the teacher to present options that appeal to most learning styles while still maintaining control over course

coverage and content (Lage et al., 2000). In this sense, only the most motivated and proactive students perform better in relation to active methodologies (Chen et al., 2014). Blended learning as an example of active methodology becomes more learning-centered, with a focus on active learning through collaboration (Rovai & Jordan, 2004).

Higher education managers and leaders should adapt and change policies in emergency situations and consider all aspects of teaching and learning (Noori, 2021). According to Garrison and Kanuka (2004), a clear policy and strong leadership leads to a faster evolution regarding this methodology in HEIs. The authors argue that controlling this evolution influences learning outcomes, student satisfaction and achievement.

The inclusion of innovative technology accompanies the transition to a different learning context, as happened during the Covid-19 pandemic, and should be based primarily on facilitating and thus enhancing the learning process (Abudaqa et al., 2021; Biju et al, 2022). According to Evans and Haase (2001), the main reason behind the growth of distance education programs has been the chance to learn without being limited by geographical and/or time boundaries.

Is is known that the Internet and the World Wide Web emerged in the early 1990s. Palvia et al. (2018) state that over the years there has been a remarkable acceptance and integration in various countries around the world and on all continents. The author refers to the good timing of the USA in 1998 in introducing blended learning into the education system; highlights the interest of countries such as India, Saudi Arabia and South Africa in promoting e-learning; and recognizes the growing popularity of e-learning in countries such as Australia.

The advancement of digital technologies in higher education is challenging traditional teaching, but on the other hand, it is also providing dynamic and innovative opportunities for student learning (O'Flaherty & Phillips, 2015). A health crisis can deeply affect the classroom teaching, so the use of social media should be considered pedagogically (Ulla & Perales, 2021). It should also be noted that in virtual environments it is very important that teachers try to "reduce" the sense of distance as much as possible (Vlachopoulos & Makri, 2019). Regular communication with the teacher through technologies allows the student greater flexibility and freedom to work and be engaged. Students may see this flexibility as a kind of time management benefit, which can lead to greater autonomy and responsibility for their learning (Rueda et al., 2017). In the same line of reasoning, Arbaugh et al. (2010) argue that this opportunity can result in benefits such as flexibility in managing family commitments as well as scheduling other work-related activities.

3.2 Modern applications – management courses

Regarding modern applications in the field of Management, there are two main strategic orientations (Table 3): a quantitative and a qualitative one. The quantitative aspect encompasses areas such as accounting and information systems management, while the qualitative aspect encompasses areas such as marketing and human resources management. Studying accounting, in the view of Lopes and Soares (2018) becomes more accessible through interactive videos than through books. According to Arbaugh et al. (2009), these types of subjects taught online tend to be a sharing of the teacher's professional experiences. Regarding the information systems management area, the same author mentions that e-learning is increasingly in vogue for this type of courses given its technological aspect. However, in courses with a more theoretical component, such as marketing and human resource management, it is essential that the activities proposed by teachers are dynamic, such as solving real case studies (Huang & Lin, 2017).

Table 3 - Characteristics and types of methods applied in the different areas of management.

| Management areas	Characteristics	Method type
Accounting and Finance	Mostly analytical and quantitative characteristics	Learn at home, practice in the classroom
Marketing	Mostly qualitative characteristics	Teachers should analyze the profile and learning styles of the students to bring about discussion exercises
Information Systems Management	Mostly analytical and quantitative characteristics	Learn at home, practice in the classroom
Human Resources Management	Mostly qualitative characteristics	Students are expected to practice knowledge and skills through a structure, yet flexible framework that provides activities before, during and after the class.

4. Bibliometric analysis - Results and discussion

This section initially discusses the general results obtained after a detailed analysis of the documents in the sample. It is important to mention that the research difficulty resulting from the scarcity of studies applied to management courses is a relevant justification for the development of this study. It is also relevant to understand the evolution of the topic under study; for example, some terms such as "distance learning" and "DE" have been equated in recent times, and there is now the possibility of adopting them in HEIs following the experience of the pandemic.

4.1 DE: evolution of the contributions

The 400 publications focused on are from scientific journals available on the Scopus platform between the years 1980 and 2020, as can be seen in Figure 2. For this 40-year period, it can be stated that the published scientific production has an average annual growth rate of 14.67%. For an identical proportion of articles, it can be seen that from 1980 to 2005 (25 years) there is moderate growth, and from 2005 to 2017 (12 years) there is faster growth. However, due to the pandemic context of Covid-19 and the consequent restrictions imposed on teaching, the peak of these scientific publications was in 2020, the highest since the beginning of the 21st century.
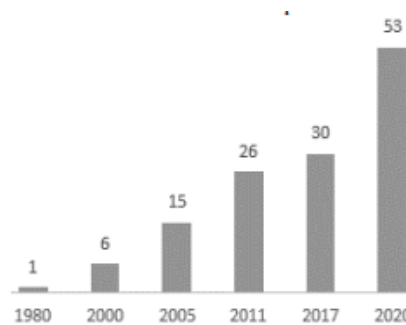
Figure 2 - Evolution of the annual scientific production on the DE modality (authors' construction based on Bibliometrix).

It is important to emphasize that all validated scientific production is conceived according to a set of studies and research; therefore, it is necessary to mention and take into consideration the source of all this knowledge, which naturally comes from the authors of the publications. According to Table 4, some authors that appear in the literature review (section 3) and that are highly cited can be highlighted, namely the following: Lage et al. (2000); Bernard et al. (2004); Garrison & Kanuka (2004); Rovai & Jordan (2004); Sun et al. (2008); López-Pérez et al. (2011); and O'Flaherty & Phillips (2015). Moreover, references to the 14 studies presented in Table 4 (together representing 3.5% of the total sample of 400 documents) – particularly the studies of Garrison & Kanuka (2004), Sun et al. (2008) and Lage et al. (2000) – represent 50.7% of all 16525 citations found in Scopus, which shows that these are the works with the greatest impact on the subject. These results also reveal the dispersion of the citations, showing that a small group of authors' works have the greatest impact in this field.

Table 4 - Major impact works (authors' construction based on Bibliometrix).

Autho(s), Year	Title	Journal	Total Citations	% Accumulated
Garrison DR, 2004	Blended learning: Uncovering its transformative potential in higher education	*Internet and Higher Education*	1675	10,1%
Sun PC, 2008	What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction	*Computers and Education*	1157	17,1%
Lage MJ, 2000	Inverting the Classroom: A Gateway to Creating an Inclusive Learning Environment	*Journal of Economic Education*	1092	23,7%
O'Flaherty J, 2015	The use of flipped classrooms in higher education: A scoping review	*Internet and Higher Education*	752	28,3%
Bernard RM, 2004	How Does Distance Education Compare With Classroom Instruction? A Meta-Analysis of the Empirical Literature	*Review of Educational Research*	688	32,5%
Alavi M, 1994	Computer-Mediated Collaborative Learning: An Empirical Evaluation	*MIS Quarterly*	679	36,6%
Strayer JF, 2013	How learning in an inverted classroom influences cooperation, innovation and task orientation	*Learning Environments Research*	648	40,5%
Rovai AP, 2004	Blended Learning and Sense of Community: A Comparative Analysis with Traditional and Fully Online Graduate Courses	*International Review of Research in Open and Distance Learning*	428	43,1%
Rovai AP, 2002	Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks	*Internet and Higher Education*	384	45,4%
Lpez-Prez MV, 2011	Blended learning in higher education: Students' perceptions and their relation to outcomes	*Computers and Education*	325	47,4%
Morris LV, 2005	Tracking student behavior, persistence, and achievement in online courses	*Internet and Higher Education*	213	48,7%
Bolliger DU, 2009	Factors influencing faculty satisfaction with online teaching and learning in higher education	*Distance Education*	160	49,6%
Guri-Rosenblit S, 2005	'Distance education' and 'e-learning': Not the same thing	*Higher Education*	144	50,5%
Stoessel K, 2015	Sociodemographic Diversity and Distance Education: Who Drops Out from Academic Programs and Why?	*Research in Higher Education*	40	50,7%
	Other		8140	100%
	Total		16525	

From Table 4, the degree of importance involved in the authors' publications can also be interpreted, considering the number of citations and the year in which the work was released. For example, an increase in the number of worldwide publications on e-learning is to be expected during the Covid-19 pandemic period or, on the other hand, an increase in citations of older publications that imply or indicate the importance of e-learning in education (Idwan et al, 2021; Husin et al, 2022). For example, Garrison (2017) states that e-learning can be considered a disruptive technology. This author's arguments are quite compatible with this disruptive scenario since we had to implement e-learning after a pandemic. It is natural that this and other articles are now being "revisited" and evaluated from a different perspective.

Still about authors, Lotka's law (1926) holds that for a larger number of scientific publications, there is a smaller number of authors, and the reverse is also true. Considering the 400 publications extracted, Table 5 confirms that a very significant part of the authors (94.4%) is dedicated exclusively to one publication on the theme under study and, on the other hand, only one author (0.1%) – Rovai, A.P. – produces more than a dozen publications.

Another basic law of bibliometrics, Bradford's law (1948, cited by Machado et al., 2016), considers that the journals with the largest number of articles published on a given subject generate a higher degree of specialization and relevance in that area. Table 6 shows a higher concentration of articles per journal (10 journals in total) in its first half (five journals), registering a notable difference thereafter.

The journals at the top of the ranking are mostly related to the Internet, technology, and DE. The most productive journal in the area, the journal "Internet and Higher Education," accounts for analyses on the effects of the Internet and information technology (IT) in many contexts in higher education. Moreover, it is devoted to advances in innovations or best practices in online teaching, learning, management, and administration. The scientific area of the remaining journals is also education and technology, but a very significant part already encompasses several levels of education, which may be an indicator of the maturation of the theme, now with new contours due to the pandemic context.

From the 400 publications extracted, some generic keywords resulted, as shown in Table 7. The relevance of these keywords is determined by the number of occurrences found in the publications, i.e., there is a small number of words that are used more frequently, as suggested by Zipf's law (1949, cited by Araújo, 2006). It should be noted that these particular keywords are not highlighted by the authors, as they only indicate the subject of the document and therefore do not specify any theme (in this case, management). The first three keywords are notably the most relevant in the group, as they directly represent the central focus of the study. Given its multiplicity and ambiguity of meanings, the fourth keyword (education) is already notably less relevant than the first, and so on.

Table 5 - Authors' productivity according to Lotka's law (authors' construction based on Bibliometrix).

Documents written	N. of authors	Proportion of authors
1	836	0.944
2	42	0.047
3	4	0.005
4	3	0.003
13	1	0.001

Table 6 - Main journals (authors' construction based on Bibliometrix).

| Journals	Amount of articles
Internet and Higher Education	35
International Review of Research in Open and Distance Learning	25
Turkish Online Journal of Distance Education	16
Distance Education	13
Computers and Education	12
International Journal of Information and Communication Technology Education	7
Journal of Computing in Higher Education	7
British Journal of Educational Technology	6
International Journal of Distance Education Technologies	6
Journal of Geography in Higher Education	6
Other	60
Total	193

Table 7 – Most frequent keywords (authors' construction based on Bibliometrix).

Words	Occurrences
Higher education	135
Distance education	98
Students	80
Education	51
Teaching	47
E-Learning	46
Online systems	25
Learning systems	24
Internet	23

At a geographical level, many countries promote and collaborate in the dissemination of articles on DE to the scientific community. It is true that some countries (some more than others) have been pressured by the population itself, because, for the most part, they are in favor of more and better conditions and alternatives in the learning process. According to Estelami and Rezvani (2011), the access to educational content at any time from any location allows students to deal with time and geographic constraints that, in other circumstances, would prevent them from attending traditional face-to-face classes.

As already mentioned in the literature review (section 3), every continent has at least one country that stands out or has stood out regarding the evolution of the DE modality and, consequently, has collaborated in the dissemination of scientific production. Taking the 400 publications focused on, that trend can be confirmed (Figure 3), highlighting the American continent, to which most scientific productivity corresponds, and, in contrast, the African continent, which has less scientific productivity. Moreover, almost all countries mentioned in the literature review (section 3) present a considerable level of scientific productivity, considering the number of documents produced, namely the following: USA, Australia, Turkey, South Africa and India.

The results suggest, therefore, certain connections to aspects such as the level of development of the countries, their size, and the increase in scientific production in the countries. For example, both the USA and Australia are highly developed countries, which enables easy access to technology. Regarding countries such as South Africa and India, the results may indicate that although they are still at a lower level of development, they are large countries where technology facilitates access to education. Both situations may influence their annual scientific production.
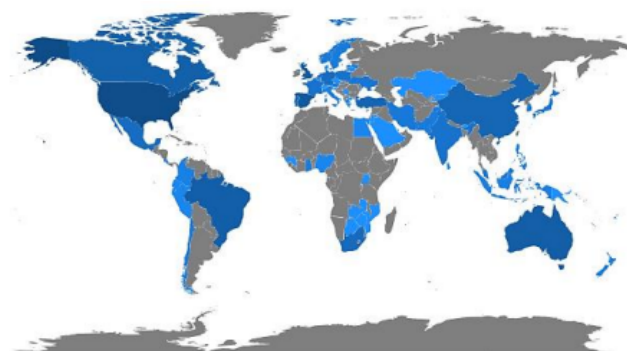
Figure 3 - Scientific production in the countries (source Bibliometrix 2021).

4.2 More in-depth results – DE on management courses

It is important to mention that the previous section of the bibliometric analysis is extensive to distance courses in higher education, in various areas of knowledge (see Figure 1). From this stage on, and with reference to the same 400 articles, a brief analysis will be made, where terms associated with management are already more evident and susceptible to interpretation.

Considering the most used and relevant keywords cited by the authors, the mapping presented in Figure 4 can be produced. Note that these keywords, unlike the
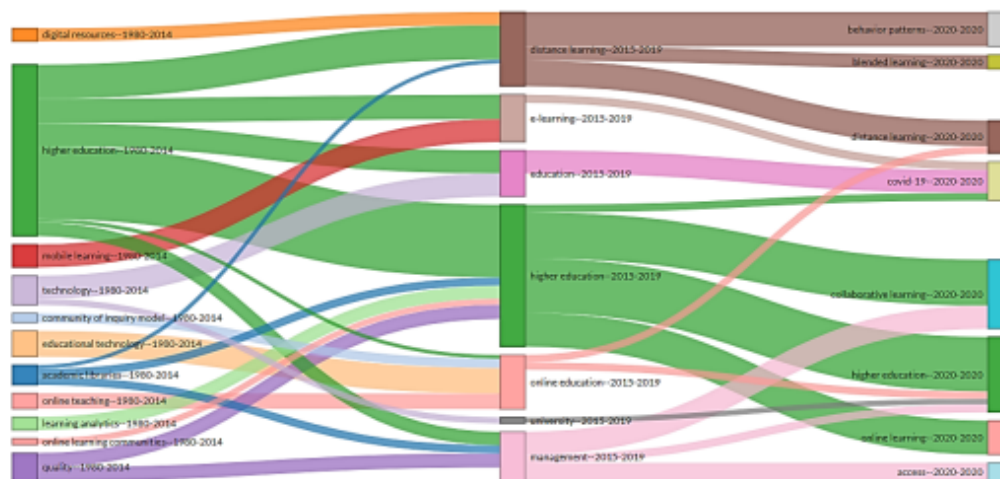
generic ones (Table 7), seek to specify the topic of DE for the management area.

Upon observing Figure 4 above, the size of the keywords "higher education" and "DE" is much larger than the others, since they are cited more frequently, and the importance of the others depends on the specific context in which they are used. On the other hand, regarding the distance of the different lines presented, it is widely accepted that, in a pandemic context, the keyword "innovation", for example, is closer to "higher education" than the latter is to "quality", because the quality practiced in HEIs is only truly established after a set of prevented attitudes, namely those that derive from the capacity of reinvention and innovation and, therefore, the literature on "innovation" is quite strongly linked to the literature on "higher education" in this study.

Figure 4 above also reveals the keyword "management" linked to the generic words "DE" and "higher education". A considerable part of the remaining words that are scattered in Figure 4 above are mentioned in the literature review (section 3).

Unlike Figure 4, where it was possible to obtain the most relevant words from the authors in a dispersed way, Dendrograms have the advantage of forming interconnections and, in this way, the themes are easily grouped and organized, as can be seen in Figure 5.

Figure 4 - Authors' most relevant keywords (source Bibliometrix 2021).

However, Andrews (2003) points out that the aim is not to find perfect interconnections between clusters, but rather to find an ideal number of clusters to facilitate future research. It should be noted that in Figure 5, the words "innovation" and "online teaching" appear on the same "branch" as "quality assurance" and "students", or if you like, "motivation" and "collaboration", which form another "branch" and culminate in "student satisfaction".

Figure 5 - Dendrogram (source Bibliometrix 2021).

75

Figure 6 - Thematic evolution (source Bibliometrix 2021).

Finally, within the scope of the keywords, they can also be reorganized according to a thematic evolution in years (time slices) and in number of words, as illustrated in Figure 6.

Observation of Figure 6 above enables some conclusions to be inferred:

- The term "higher education", in darker green, runs through the entire length of the graph and is therefore considered a constant.
- The term "digital resources", in orange, has evolved over the years and is linked to the term "distance learning", in brown, which is also associated with the term "higher education", thus suggesting new possibilities, namely the application of new methodologies, such as "blended learning".
- The term "management", in light pink, is linked, among others, to the terms "higher education" and "collaborative learning", which expresses the interaction in the (active) learning of students, either in more theoretical curricular units or in more practical ones.
- The term "management" is also linked to the expression "open access", which may suggest a tendency to make information and materials from this rich and broad area of study available in open resources with universal access.

5. New avenues and concluding remarks

Resistance and prejudice towards the DE modality could, in an unexpected and sudden context such as the Covid-19 pandemic, have hindered better teacher performance. However, even in the absence of an established protocol and the existence of certain drawbacks (such as sharing a device or space to attend virtual classes), HEIs were generally able to maintain the level of motivation on the part of students (Castro,

Moreira, & Carvalho, 2021). It follows that the fact that students prefer face-to-face interaction does not determine that online contact is a weakness in higher education, but rather a challenge, as suggested by the transactional distance theory formulated by Moore and Kearsley (2005), which emphasizes that distance is mainly a pedagogical phenomenon. It is certain that there has been mutual learning between the parties to enable new practices that imply digitalization, such as, for example, the integration of social networks, and, therefore, the aforementioned challenge is already beginning to be relativized by some students.

This study contributes to a better understanding of the evolution of DE in general and, particularly in the context of management courses. With the results obtained from the bibliometric analysis, it should be noted that:

- The main generic themes explicitly referenced are higher education, DE and students. In the set of topics that have gained importance in recent decades with the integration of DE in HEIs, the issues related to innovation, quality assurance, motivation, collaboration, and student satisfaction stand out. These topics seem not to appear at random and may contribute to a better understanding of how studies on this subject in higher education work and evolve. The issues of pedagogical innovation, new ways of collaborating and improving student satisfaction seem to be crucial, and, along with this, an old topic that is always brought up when DE is talked about, the quality of this teaching that requires evaluation and the creation and maintenance of standards that make it reliable, remains in vogue.
- It is possible to see that the social sciences, computer science, and business, management and accounting are the areas most studied by the authors (see Figure 1), which are also very closely related to the management area.

Regarding management and related areas, it is not surprising that the computer science area appears in this context; it seems more like a current trend to study more general themes in management and especially in accounting due to the characteristics of the respective curricula.

- From the set of journals included, the one that appears as the most relevant is called Internet and Higher Education. The journal is interdisciplinary; however, it has a strong connection with IT (subarea of management). Nowadays, the use of the Internet as an instructional tool in higher education is crucial. Due to the pandemic, the emergence of online instruction has created new challenges for teachers and students to work together, solving problems common to both parties.
- The volume of publications has not been constant over time, with the largest number of publications in the most recent period, which can be justified by the occurrence of the pandemic and the increased use of this type of teaching that increases the interest of researchers.
- There is a strong geographical asymmetry of the authors of the publications, particularly from Australia and three Anglo-Saxon countries, namely USA, Canada, and the UK, which contrasts with a very significant part of African countries and some Asian and South American countries. Aspects related to the maturity of education systems and access to technology may justify the trend in the three leading countries in the Northern Hemisphere and Oceania. The size of the countries and cost of DE (substantially lower than face-to-face) may also justify its prevalence being detected through studies in South American (Brazil), Asian (India) or African (South Africa) countries.

It is worth highlighting some results from this analysis, namely regarding words that have gained a new prominence in the HEIs' practices and, furthermore, the temporal and circumstantial contextualization of this most recent period, which was characterized by a rapid transition to digitalization models in several sectors where teaching is included.

The pandemic has intensified new forms and terms of adaptation within the scope of the DE that HEIs were familiar with; that is, there has been a clear revolution with respect to technology, assessment systems, and teaching strategies in terms of this teaching–learning model. It was found that innovation is gaining more and more space in HEIs and can be seen as an ally regarding the learning of the parties involved in the process, in the sense of enabling new practices that imply digitalization. Li et al (2023) share this view, saying that different teaching formats enable teachers to create enriching experiences, especially group work.

The bibliometric analysis reinforces the importance of motivation and collaboration, not only in this transition which has been deeply marked by the pandemic, but in all circumstances that aim to keep students satisfied and confident.

Finally, the greater temporal prominence already shown by the bibliometric analysis to the year 2020 may evidence that several authors have readapted and updated some of their works due to this disruptive year. One can certainly expect these to be studies coming from countries such as Australia or English-speaking countries such as the USA.

5.1 Limitations and possible future research

This study has some limitations. Regarding bibliometrics, since the databases have different profiles, the researcher must find the one that gathers more authors and relevant journals available for the topic under study. For a first exploratory study, one considered Scopus as the most appropriate database. In addition, there are articles published by more reputable authors that may be unavailable. It is also advisable to check that the article does not discretely "sidestep" the topic (false positives). Furthermore, the main limitation of this study can be seen as a potential contribution to the scientific community, because the perceived difficulty in finding scientific articles that address the subject of management and its courses can be seen as a stimulus for greater scientific production in this area.

It would be interesting, as future research, to develop a complementary study to the one carried out, targeting teachers, since they represent a central and even structural part of higher education. It would be interesting to understand what has changed, and if anything has changed, in their thinking and perception after the digital experience caused by the pandemic, as well as to analyze the evolution of these studies and trends in the post-pandemic period.

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