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Sustainable Development Goals and Education: A Bibliometric Review—The Case of Latin America

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Abstract: The aim of this article is to review Latin American scientific production on the Sustainable Development Goals (SDGs) in the field of education. For this purpose, a bibliometric analysis is performed on WoS articles, and a content analysis is carried out on empirical articles from 2015–2022. The main findings indicate that (1) since 2016, a considerable increase in scientific production is evidenced, reaching a peak of 30 articles in 2020; (2) Brazil is the most productive and influential nation in the region; (3) in general, good levels of international cooperation are evidenced, although only Brazil and Mexico show outstanding levels of scientific cooperation with countries in the Global North; (4) most of the analyzed papers were published in education journals, with a smaller percentage in specialized higher education journals; and (5) there are two main lines of research within the empirical papers: "Curriculum, extracurricular activities, projects, and pedagogical initiatives" and "Students' behaviors, perceptions, beliefs, concerns, and level of knowledge around issues related to the SDGs". We conclude that although Latin American production has increased in the last period, contributions continue to be marginal at global levels.

Keywords: Sustainable Development Goals (SDG); 2030 agenda; education; bibliometric review; Latin America

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1. Introduction

In 2000, the United Nations (UN) established the Millennium Development Goals (MDGs), the most comprehensive and well-supported internationally agreed development goals to date, which aimed to provide a framework for international action toward the achievement of common goals, such as poverty reduction [1].

Building on the MDGs, in 2015, the UN adopted 17 Sustainable Development Goals (SDGs) and 169 targets, which reflected an expanded international effort to create sustainable [2], more equal, prosperous, and secure societies [3]. These goals and targets have an integrated character, seek coordinated work between governments, businesses, academia, and civil society, and bring together the three dimensions of sustainable development, i.e., social, economic, and environmental [4,5].

In essence, the SDGs constitute both an approach to achieving sustainable development and a tool to address global problems collaboratively and in an interconnected manner [6], which sets in motion strategic actions to address the global challenges of modern societies [7], such as the fight against poverty and hunger, ensuring health and education, sustainable management of natural resources, climate change, gender equality, cultural diversity, human rights, and civic responsibility [8].

Differing from their predecessors, including the MDGs that expired at the end of 2015, the SDGs were defined through a lengthy, open, and transparent process that included the most extensive international consultation ever held, and involved a variety of parties, such as governments, NGOs, and businesses [9,10]. Additionally, the SDGs expanded the

agenda to include topics such as climate change, sustainable consumption, innovation, and the importance of peace and justice as goals to be achieved by 2030, demanding action from all countries [11].

SDG4, entitled Quality Education, seeks to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all", and is inspired by a humanistic vision of education and development based on human rights, dignity, social justice, inclusion, protection, diversity, shared responsibility, and accountability [12]. Fostering lifelong learning opportunities for all supports the idea that there is a need to build bridges between actors, institutions, processes, learning spaces, and moments to enable holistic learning opportunities and systems [13].

It should be clarified that education is not limited only to SDG4 but is linked to all other goals [14], including SDG3 on good health and well-being, SDG5 on gender equality and women's empowerment, and SDG8 on decent work [15].

Undoubtedly, the SDGs are a contingent issue at the global level, and it is not surprising that different researchers have contributed to the discussion through the generation of knowledge from academia. In view of this, it is worth asking what is being addressed in relation to the SDGs, where the greatest contributions are being made, who is leading the discussion, and how research is being carried out, among other questions. Bibliometrics seems to be a good way to provide answers to these questions, as it allows the evaluation of accumulated scientific knowledge and evolutionary nuances [16] through applying quantitative and statistical techniques on a set of bibliographic data [17]. These analyses are very useful as they guide the researcher to the most influential papers and map the research field in an objective manner [18].

A preliminary search found bibliometric reviews on SDGs in the educational field. This information has been addressed at general levels (e.g., [4,19]) and in more focused areas, such as higher education [20] and SDG4 [14]. Despite the above, this search did not yield any reviews focused on Latin America, thus evidencing a gap in existing knowledge.

Speaking of Latin America, indicators show that in recent years, even before the educational crisis caused by the COVID-19 pandemic, there was a slowing of progress toward the SDGs [21]. This is worrisome, as stagnation in this area would impede achieving equality and attaining higher levels of development, among other things. In this context, scientific papers are key, as they can evidence the most critical issues to be debated in Latin American society, propose solutions for them, and ultimately enhance efforts in pursuit of sustainable development in the region [22].

Given this situation, this study aimed to review Latin American scientific production regarding SDGs in education. To achieve this objective, the authors addressed the following research questions:

RQ1: What is the volume and growth trajectory of the knowledge base?
RQ2: What is the preferred type of document and language used by researchers to write their papers? In which WoS thematic categories are the analyzed publications classified?
RQ3: What is the geographic distribution of the knowledge base? Is there international collaboration?
RQ4: What are the most productive and influential journals, authors, and institutions on SDGs in the educational field?
RQ5: What are the most influential publications in the field?
RQ6: What are the co-citation patterns of the analyzed articles?
RQ7: What are the most used keywords in SDGs research in Latin America? What are the relationships between the keywords?
RQ8: What are the most studied topics in empirical research in the field?

Articles extracted from the Web of Science Core Collection (WoSCC) covering the period 2015–2022 were analyzed. Through a bibliometric and content approach, this paper seeks to contribute to the field by identifying trends, gaps, evolving nuances, and fundamental elements.

This article is structured in six parts. The introduction is followed by the methodology, which details the sample selection process, the analyses conducted, and the scope of the research. Following this, the obtained results and the discussion are outlined. Finally, the conclusions and limitations of the study are addressed.

2. Materials and Methods

A bibliometric analysis was performed to meet the proposed objectives. In this type of analysis, different variables linked to scientific production in a field are studied [14], thus contributing to a better understanding of the structure of the data in order to elucidate the chronological development of an academic field [8], and to provide researchers with a solid basis for positioning current contributions and detecting new lines for future work [4]. Because of this, bibliometrics has been used for a long time in various disciplines and multiple contexts [23].

In this study, performance analysis and scientific mapping are performed, as employing both helps to reduce subjectivity and improve our understanding of the current and future structure of the field of study [24]. The first analysis is descriptive in nature, and accounts for the contributions of research components [16], while the second focuses on the relationships between these components, exploring the impact of a particular topic, group of researchers, or paper [19].

WoSCC is a core database collection under the WoS platform and consists of ten sub-datasets, of which eight are citation indexes and two are chemical indexes [25]. For this study, we used the sub-databases to which the authors' university of affiliation subscribes, i.e., Science Citation Index Expanded (SCIE) (1975—present), Social Sciences Citation Index (SSCI) (1975—present), Arts and Humanities Citation Index (A & HCI) (1975—present) and Emerging Sources Citation Index (ESCI) (2018—present).

The choice of WoSCC as the database for this review is based on the fact that it is recognized internationally among researchers for incorporating high-profile journals from various disciplines of knowledge; in addition, it is a leading source of scholarly research data because it offers trusted coverage and metrics, which makes it one of the main tools for bibliometric studies [26,27].

In the search for relevant papers, the concepts "Sustainable Development Goals", "SDGs", "Sustainable Development Objectives", or "2030 Agenda" were used as topics. These descriptors were chosen based on the work of Prieto-Jiménez et al. [19]. Documents were filtered according to the following criteria:

- Year: Publications dated prior to 2015 were excluded. This strategy was chosen because 2015 was the date that the SDGs were proposed by the UN.
- Countries: Latin American nations. For this study, only countries of the American continent whose official language is Spanish or Portuguese were considered.
- WoS categories: "Education-Educational Research" and "Education Scientific Disciplines".

Figure 1 shows the workflow for data collection. First, the WoS search was performed following the required concepts identified. Following this, in steps 2, 3, and 4, the documents were filtered according to the inclusion and exclusion criteria defined above. Afterward, the records were checked for debugging using Microsoft Excel (Microsoft Corporation, Redmond, WA, USA), and two duplicate records were found in this step. Thus, a final sample of 111 articles was obtained and extracted from the database on 18 December 2022, in plain text format.

Bibliometrix (R Studio) (University of Naples Federico II, Naples, Italy) and VOSviewer (Centre for Science and Technology, Leiden University, Leiden, The Netherlands) software were used for data processing. Bibliometrix was mainly used to perform the performance analysis, i.e., to obtain descriptive statistics on the most relevant countries, journals, authors, and publications. VOSviewer, on the other hand, was used for elaborating bibliometric networks and maps. Based on the study of clusters (relational nodes), this software allowed

us to generate analyses of co-authorship (countries), co-citation (authors and documents), and co-occurrence of keywords.

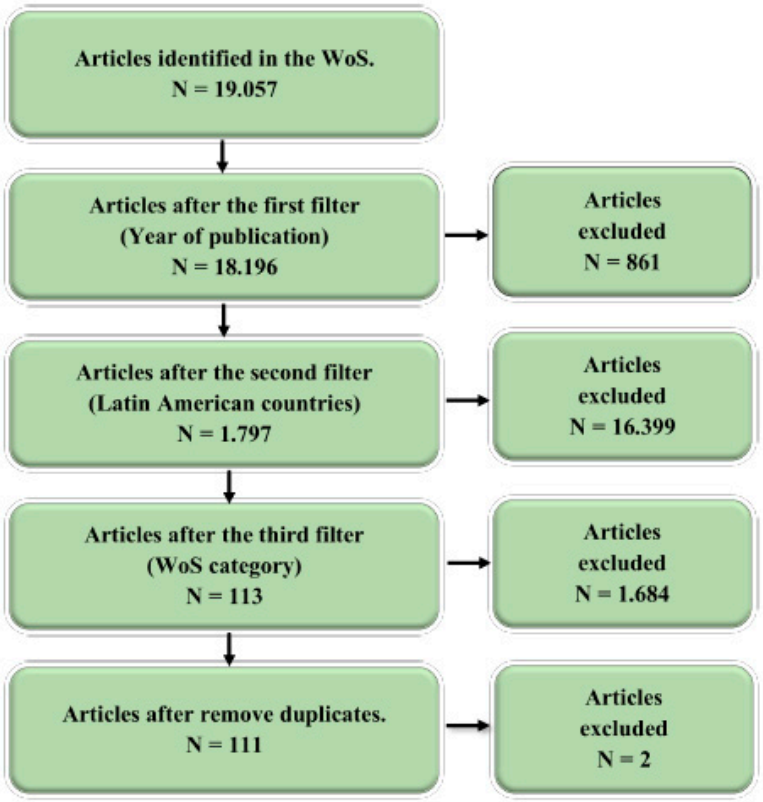


Figure 1. Flow diagram.

The co-authorship map is made to determine the levels of collaboration between countries represented within the sample. Countries that have collaborated with others on more papers are assigned thicker lines on the map. Co-citation analysis uses citation tools to connect authors and referenced papers in this case, and thus determine the intellectual structure [24]. The map's lines reflect the citation relationship between nodes, the thickness of these being the number of citations between the two groups [28]. Meanwhile, the authors' keyword co-occurrence analysis allows the identification of crucial thematic foci in the knowledge base of a scientific field [2]. Here, the lines represent the number of connections with other descriptors [14].

Overall, the interpretation of a VOSviewer map should be based on the nodes' size, distance, and color. The larger the size of the term, the higher the frequency of occurrence in the analyzed sample, and the smaller the distance between them, the more related they are [29]. The colors, meanwhile, represent groups of strongly related terms [28].

Finally, the content analysis technique was used to better understand the themes around the SDGs addressed in the sample articles. Therefore, first, each of the publications was manually reviewed to establish those of an empirical nature (participatory/action research). Then, these were reviewed in depth to establish the categories and subcategories of analysis.

3. Results

The results of the bibliometric and content analysis based on this dataset are presented according to the foci of the eight research questions.

3.1. Volume and Growth Trajectory of the Knowledge Base

A total of 111 publications indexed in WoS were retrieved. While the period for this bibliometric analysis begins in 2015, the year in which the UN proposed the SDGs, the first work identified in the sample was published in 2016. Generally, (see Figure 2), an upward trend in the number of publications can be observed, with a peak of 30 articles in 2020. If the extremes of the period are considered, a significant increase in the productivity of Latin American authors can be observed, as they went from having one publication in 2016 to 25 in 2022.

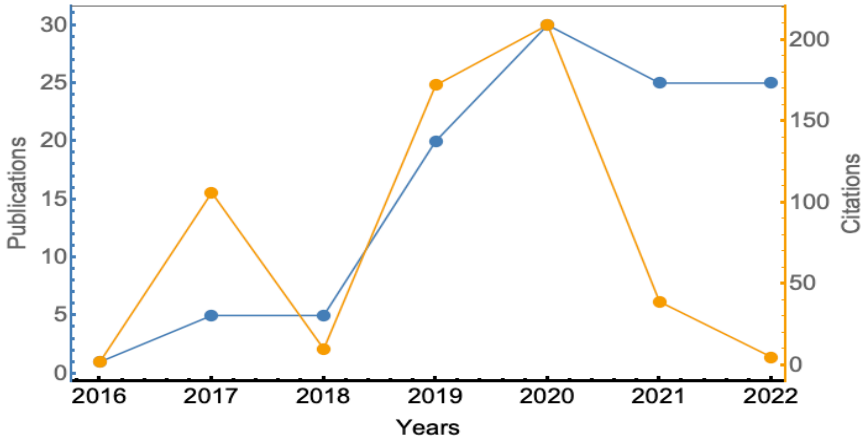


Figure 2. Annual scientific production and number of citations received.

In terms of citations received, although publications in 2020 accumulated the highest number of citations, 2017 is by far the year with the highest average number of citations per article (21.20).

3.2. Type of Document, Language and WoS Thematic Categories

A total of 109 were identified as scientific articles (98.20%), 9 as early access articles (8.11%), and 2 as review articles (1.80%). Regarding the language of the publications, 66 were in English (59.46%), 38 were in Spanish (34.23%), and 7 were in Portuguese (6.31%).

The WoS thematic categories in which these publications are classified (see Table 1) mainly cover the fields of education (94.59%) and green and sustainable science and technology (29.73%). However, there are also other categories, such as those related to business and management and health and wellness, to name a few.

Table 1. Web of Science categories.

WoS Category	Total Articles	%
Education Educational Research	105	94.59
Green Sustainable Science Technology	33	29.73
Business	8	7.21
Management	8	7.21
Education Scientific Disciplines	6	5.41
Engineering Chemical	3	2.70
Chemistry Multidisciplinary	2	1.80
Geography	1	0.90
Health Care Sciences Services	1	0.90
Neurosciences	1	0.90
Psychology Experimental	1	0.90
Public Environmental Occupational Health	1	0.90

3.3. Geographic Distribution and International Collaboration

Table 2 shows the Latin American nations with some representation in the works analyzed in this study. It is important to note that when we mention the country, we are referring to the place in which the researcher works (affiliation), which may differ from their country of birth or citizenship.

Table 2. SDGs publications in education in Latin American countries [1].

	Authorship or Co-Authorship					Correspondence Author		
Rank	**Country**	**Total Articles**	**%**	**Total Citations [2]**	**Citations/Articles**	**Country**	**Total Articles**	**%**
1	Brazil	44	39.64	385	8.75	Brazil	38	34.23
2	Mexico	17	15.32	66	3.88	Mexico	12	10.81
3	Chile	14	12.61	22	1.57	Chile	10	9.01
4	Cuba	14	12.61	4	0.29	Ecuador	9	8.11
5	Ecuador	12	10.81	30	2.50	Cuba	8	7.21
6	Colombia	9	8.11	12	1.33	Colombia	4	3.60
7	Argentina	4	3.60	6	1.50	Argentina	2	1.80
8	Venezuela	3	2.70	7	2.33	Venezuela	2	1.80
9	Peru	3	2.70	4	1.33	Nicaragua	1	0.90
10	Nicaragua	2	1.80	16	8.00	Peru	1	0.90
11	Dominican Republic	1	0.90	3	3.00			
12	Bolivia	1	0.90	2	2.00			
13	Guatemala	1	0.90	2	2.00			
14	Uruguay	1	0.90	0	0.00			

[1] Non-Latin American countries are excluded from the list. [2] Times cited in WoSCC.

This table shows that if authorship or co-authorship is considered, 14 countries in the region have some associated work. This figure decreases to 10 if only the country associated with the corresponding author is considered. Nevertheless, regardless of the criterion, Brazil, Mexico, and Chile are the most relevant countries in the region regarding knowledge production.

Regarding international collaboration patterns, 47 publications (42.34%) were written by researchers from different countries. Outside Latin America, the main collaborations were with authors linked to English (13; 11.71%), the United States (12; 10.81%), Spanish (11; 9.91%), Canadian (8; 7.21%), and German (8; 7.21%) institutions.

The map of international collaboration is shown in Figure 3. VOSviewer identified three clusters (red, green, and blue). The red cluster has the most significant number of countries (seven) and is led by Mexico as the Latin American country. Brazil and Mexico are the most collaborative countries in the region, and Chile, Colombia, Cuba, and Ecuador follow them. Brazil's strongest collaborations are with England (link strength = 9) and Germany (LS = 6), while Mexico's are with France (LS = 3), Belgium (LS = 3), Spain (LS = 3), England (LS = 3), Canada (LS = 3), and the United States (LS = 3).

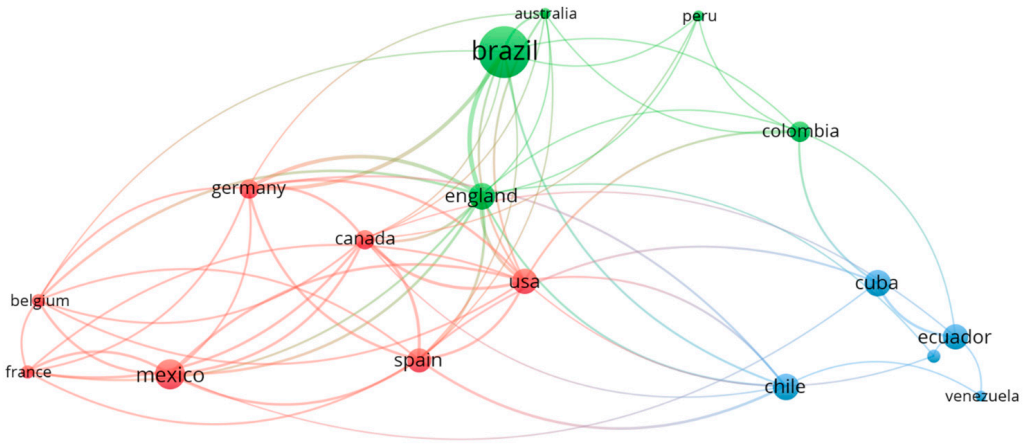


Figure 3. Country/region co-authorship (VOSviewer: minimum three papers).

3.4. Productive and Influential Journals, Authors and Institutions

The 111 articles were published in 48 different journals. A total of 97.30% of the publications are in education journals, including 33.33% in specialized higher education journals: 33 in the International Journal of Sustainability in Higher Education, 1 in Higher Education, 1 in the Journal of Further and Higher Education, 1 in Revista Digital de Investigación en Docencia Universitaria-RIDU, and 1 in the Journal of Applied Research in Higher Education. The remaining papers are published in health journals (Medical Teacher and Health Education Journal) and general social sciences journals (Revista Publicando).

If we analyze the country of origin of the 48 journals in which the research was published, it is found that 54.17% of these are from Europe (75 articles; 67.57% of the total), 37.50% are from Latin America (31 articles; 27.93%), and only 8.33% are from North America (United States or Canada) (four articles; 4.50%). From this, it can be observed that, at a general level, there is a clear preference on the part of Latin American authors to publish in European journals, of which ten are from Spain, nine from the United Kingdom, five from the Netherlands, and two from Switzerland.

Table 3 shows the most relevant journals. The International Journal of Sustainability in Higher Education (IJSHE) is the most productive, with 33 publications. Furthermore, concerning the influence of the journals, measured by the number of citations, the International Journal of Management Education (IJME) and IJSHE are the most outstanding (TC > 150 citations); meanwhile, if the average number of citations per article is considered to be the same, Medical Teacher (MT) (52.00), IJME (20.50) and Education for Chemical Engineers (ECE) (20.00) stand out from the others. Based on the productivity and influence indicated above, the authors suggest that the IJSHE, IJME, MT, and ECE are the central journals on SDGs issues in education in Latin America. These four are prestigious international journals and are published in English.

Table 3 also shows that only four sources have an impact factor (JIF) according to the Journal Citation Reports (JCR). Most of the journals in the ranking are indexed in ESCI (Emerging Sources Citation Index), a collection not included in JCR (hence its lack of JIF). The ESCI is described as a collection that covers local content of regional significance and allows the discovery of emerging scientific trends [26].

Table 4 shows the sample's most productive and influential Latin American authors. L. L. Brandli (Universidade de Passo Fundo) stands out as the most productive author, with six publications, followed by A. B. A. Avelar (Universidade Municipal de São Caetano do Sul) and A. L. Salvia (Universidade de Passo Fundo), with four articles each.

Table 3. Most productive journals that include publications related to SDGs, indexed in WoS (minimum two papers).

Rank	Journal	Country	Language [1]	Total Articles	Total Citations [2]	Index	JIF 2021
1	International Journal of Sustainability in Higher Education	United Kingdom	ENG	33	158	SSCI	4.120
2	International Journal of Management Education	Netherlands	ENG	8	164	SSCI	4.564
3	Revista Conrado	Cuba	SPA	7	1	ESCI	-
4	Alteridad-Revista de Educación	Ecuador	SPA	4	4	ESCI	-
5	Profesorado-Revista de Curriculum y Formación de Profesorado	Spain	ML	4	11	ESCI	-
6	Education for Chemical Engineers	Netherlands	ENG	3	60	SCIE	3.200
7	Revista de Educación y Derecho-Educational and Law Review	Spain	SPA	3	0	ESCI	-
8	Revista Iberoamericana de Educación	Spain	ML	3	2	ESCI	-
9	Dilemas Contemporáneos-Educación, Política y Valores	Mexico	SPA	2	0	ESCI	-
10	Journal of Chemical Education	United States	ENG	2	23	SCIE	3.208
11	Luz	Cuba	SPA	2	0	ESCI	-
12	REMEA-Revista Eletrônica do Mestrado em Educação Ambiental	Brazil	POR	2	0	ESCI	-
13	Revista Electrónica Educare	Costa Rica	SPA	2	0	ESCI	-
14	Revista Española de Educación Comparada	Spain	SPA	2	6	ESCI	-

[1] ENG: English; SPA: Spanish; POR: Portuguese; ML: multi-language. [2] Times cited in WoSCC.

Table 4. Ranking of the most productive and influential authors [1].

Rank	Author	Total Articles	Country	Author	Total Citations [2]	Country
1	Brandli, LL	6	Brazil	Brandli, LL	66	Brazil
2	Avelar, ABA	4	Brazil	Borges, JC	60	Brazil
3	Salvia, AL	4	Brazil	Caldana, ACF	60	Brazil
4	Pereira, RD	3	Brazil	Ferreira, TC	60	Brazil
5	Arruda, ND	3	Brazil	Avelar, ABA	53	Brazil
6	Reginatto G	3	Brazil	Pereira, RD	53	Brazil
7	Rebelatto, BG	3	Brazil	Da Silva-Oliveira, KD	53	Brazil
8	Anholon, R	3	Brazil	De Barros, EF	52	Brazil
9	Quelhas, OLG	3	Brazil	Morales-Menendez, R	47	Mexico
10	Rampasso, IS	3	Chile	de Oliveira, MSB	43	Brazil

[1] 406 authors in total. Authors affiliated with non-Latin American institutions are excluded from the table. [2] Times cited in WoSCC.

The analyzed publications accumulated a total of 543 citations up to the data extraction date. L. L. Brandli, J. C. Borges (Universidade de São Paulo), A. C. F. Caldana (Universidade de São Paulo), and T. C. Ferreira (Universidade de São Paulo)—the latter three co-authors of two publications—stand out among their peers, as they individually received over 60 citations.

Finally, assessing the latest affiliations indicated by the authors in their papers, it is found that researchers linked to Brazilian institutions are by far the most prominent, as they lead both the ranking of productivity and influence. Thus, Brazil stands out from the other countries in the region and establishes itself as a significant source of scientific contributions to SDGs in education.

Table 5 shows the institutions that publish the most on the SDGs in the field of education in Latin America. The number of publications and citations of the top 10 institutions depict their productivity and impact in academia.

Table 5. Leading SDGs research institutions in Latin America.

Rank	University	Country	Total Articles	%	Total Citations [1]	Citations/Articles
1	Universidade de Passo Fundo	Brazil	8	7.21	72	9.00
2	Fundação Getulio Vargas	Brazil	5	4.50	55	11.00
3	Tecnológico de Monterrey	Mexico	5	4.50	52	10.40
4	Universidade de São Paulo	Brazil	4	3.60	83	20.75
5	Universidade Estadual de Campinas	Brazil	4	3.60	13	3.25
6	Universidade de Caxias do Sul	Brazil	3	2.70	66	22.00
7	Universidade Federal de São Carlos	Brazil	3	2.70	21	7.00
8	Universidade Federal Fluminense	Brazil	3	2.70	11	3.67
9	Universidad de Cienfuegos	Cuba	3	2.70	2	0.67
10	Universidad de Holguín	Cuba	3	2.70	0	0.00

[1] Times cited in WoSCC.

The Brazilian universities, as can be seen, are the most recurrent in the ranking (seven times). The most productive institution is the Universidade de Passo Fundo, while the institution that has received the highest number of citations is the Universidade de São Paulo. In the case of the first university, all of its articles were published in the IJSHE, and in the second, most of its publications (three) were published in the IJME.

Regarding institutions outside Latin America, the Hamburg University of Applied Sciences stands out with five publications, and Manchester Metropolitan University with four articles.

3.5. Influential Publications

Table 6 shows the most influential publication in the sample, in which the Brazilian Enrique Falceto de Barros participates, collaborating with professionals and academics from different parts of the world, with 52 citations. This publication [30] provides a consensus statement that seeks guidelines for the education of health professionals in pursuit of sustainable health care. It is followed by the work of Avelar et al. [4], who systematically reviewed the literature on education to advance the implementation of the SDGs.

The remaining articles cover issues such as barriers to innovation and sustainability in universities [31], environmentally sustainable practices [32], and recent energy efficiency actions [3] implemented by Brazilian universities, guidelines and examples to improve the teaching of the holistic framework of process intensification [33,34], the implementation of the Principles for Responsible Management Education (PRME) in school curricula [35], and the identification of informal and implicit learning perspectives and demands by students and their relationship with student organizations [36,37].

Similarly, from the following list, it can be observed that the most cited articles were published in four journals: IJME (four articles), IJSHE (three), ECE (two), and MT (one). These journals have a high impact factor in education (all Q1 except ECE, which is Q2) and publish in English. Likewise, only one of these publications was written by a single author, and the others had a minimum of three researchers. Regarding international collaboration in these works, only three articles have co-authors affiliated with institutions outside Latin America.

Table 6. Ranking of the 10 most cited articles in the sample.

Rank	Author/s	Journal	Year	Total Citations [1]	Total Citations/Year
1	Shaw et al. [30]	Medical Teacher	2021	52	26.00
2	Avelar et al. [4]	The International Journal of Management Education	2019	49	12.25
3	Borges et al. [37]	The International Journal of Management Education	2017	43	7.17

Table 6. *Cont.*

Rank	Author/s	Journal	Year	Total Citations [1]	Total Citations/Year
4	de Paula Arruda Filho [35]	The International Journal of Management Education	2017	34	5.67
5	Rivas et al. [33]	Education for Chemical Engineers	2020	27	9.00
6	Veiga Ávila et al. [31]	International Journal of Sustainability in Higher Education	2019	27	6.75
7	Rivas et al. [34]	Education for Chemical Engineers	2020	20	6.67
8	Borges et al. [36]	The International Journal of Management Education	2017	17	2.83
9	Rebelatto et al. [3]	International Journal of Sustainability in Higher Education	2019	16	4.00
10	Barros et al. [32]	International Journal of Sustainability in Higher Education	2020	14	4.67

[1] Times cited in WoSCC.

Table 7 shows the most cited publications among the articles in the sample. Although these documents have a considerable number of citations in WoS (CT > 57) and Google Scholar (CT > 110), they have fewer citations in the documents analyzed. This results from the fact that, at least considering the Latin American sample, there is no common framework or theory through which the field of research is addressed and developed [38].

Table 7. Most referenced publications in the sample articles.

Rank	Author/s	Year	Total Citations in the Sample	Total Citations in WoSCC [1]	Total Citations in Google Scholar [1]
1	Leal Filho et al. [39]	2019	8	152	271
2	Parkes et al. [40]	2017	7	57	117
3	Ávila et al. [41]	2017	7	94	232
4	Kolb et al. [42]	2017	6	69	147
5	Weybrecht [10]	2017	6	58	110
6	Lozano et al. [43]	2013	6	503	1131

[1] 2 January 2023.

Some 8 of the 111 articles in the sample cite the work of Leal Filho et al. [39]. Here, the authors explore how universities are adopting the SDGs and the advantages of introducing these goals in teaching. This work is followed by Parkes et al. [40] and Ávila et al. [41], with seven citations each. The first puts research around PRMEs at the center, while the other analyzes the barriers to innovation and sustainable development in universities. The following three studies have six citations each. They address issues such as the relationship between the SDGs and education in business schools [10,42] and the statements, charters, and partnerships developed in higher education to aid in improving effectiveness in sustainable development [43].

3.6. Co-Citation Patterns

Complementary to the previous analysis, Figure 4 shows the map of co-citations of those papers referenced in at least four articles (23 fulfilled this requirement). The network of co-cited publications was divided into two clusters. The first cluster, identified in red, groups papers addressing barriers and challenges to achieving sustainability in higher education (e.g., [6,7,44]), university sustainability statements, reports, charters, and initiatives [43,45,46], and the teaching of sustainability in these institutions [39,47]. The green cluster, meanwhile, focuses mainly on discussing different aspects linked to the PRME, business schools, and their relationship with the SDGs (e.g., [10,11,40,42,48–50]).

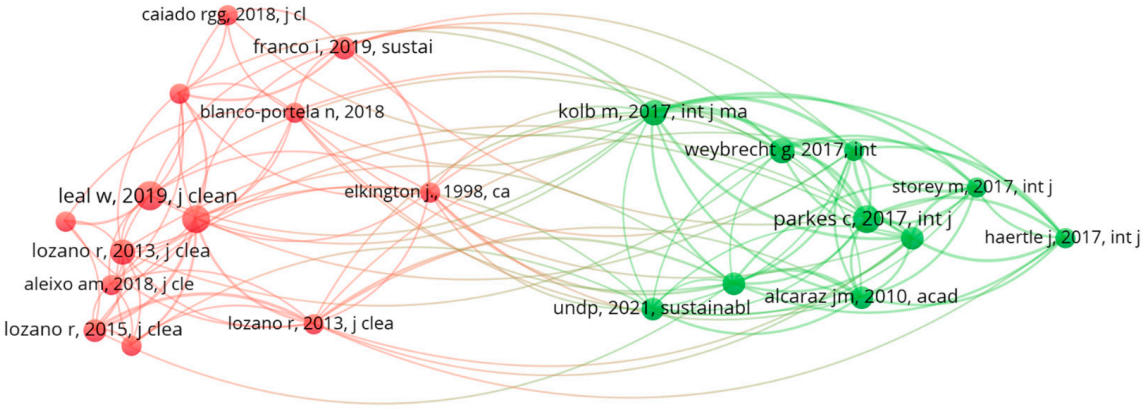


Figure 4. Map of co-citation of documents (VOSviewer: minimum four co-citations).

Some 23 of the 3,324 co-cited authors met the threshold of a minimum of seven co-citations (see Figure 5). VOSviewer identified five clusters representing different schools of thought.

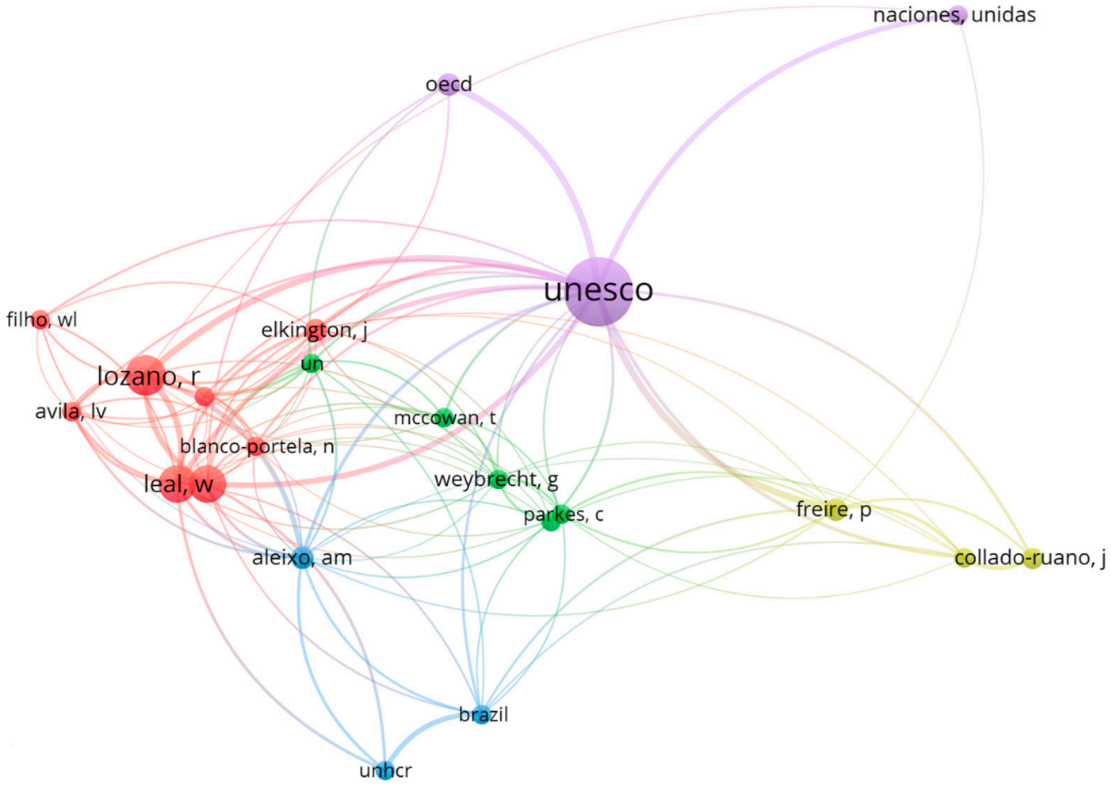


Figure 5. Author co-citation map (VOSviewer: minimum seven co-citations).

The purple cluster includes international organizations that have defined and promoted the SDGs, such as UNESCO (90 co-citations), OECD (10), and the UN (8). The yellow, meanwhile, groups together works with a philosophical perspective on education, whose leading exponents are Paulo Freire (10), Javier Collado Ruano (9), and Edgar Morin (8). Blue focuses mainly on refugees, with the UN Refugee Agency (UNHCR) (7) representing one of the most prominent authors. Another researcher in this group is Ana Marta Aleixo (10), who is dedicated to studying the issue of sustainability in higher education institutions (especially in Portugal and Brazil) and who stands out for their continuous references to laws, norms, and resolutions regarding this issue. Meanwhile, the green conglomerate mainly represents the school of thought focused on corporate and business

sustainability. Some of the key authors are Giselle Weybrecht (8), Andreas Rasche (7), and Carole Parkes (7).

Finally, red has the most significant number of authors. Here, we may find researchers such as Rodrigo Lozano (31), Walter Leal Filho (27), John Elkington (10), Matthias Barth (8), Lucas Veiga Avila (8), and Norka Blanco Portela (7), who have addressed sustainability on organizational, corporate, and educational levels, and from the perspective of development, innovation, and climate change.

3.7. Keywords and Their Relationships

From a total of 394 keywords used by the authors, VOSviewer identified four clusters from the 18 terms with more than three occurrences (see Figure 6).

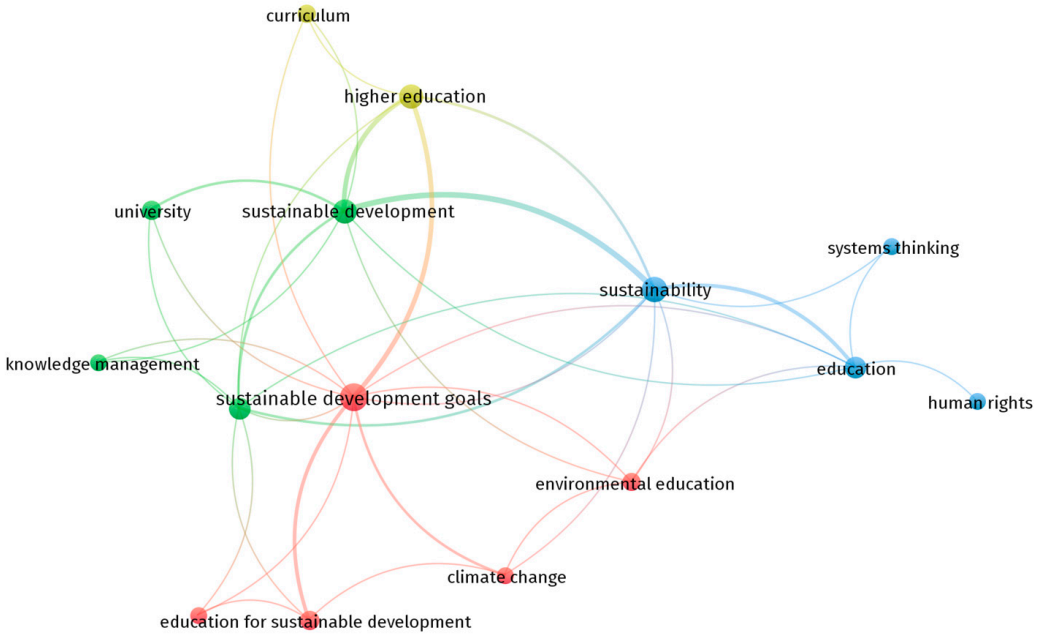


Figure 6. Keyword co-occurrence analysis (VOSviewer: minimum three occurrences).

Disregarding the search descriptors, the red cluster groups concepts related to "education for sustainable development" (five occurrences), "environmental education" (four), "climate change" (three), and "PRME" (three). The green cluster includes terms such as "university" (five) and "knowledge management" (three), while the blue cluster includes concepts such as "sustainability" (twenty), "education" (eight), "human rights" (three), and "systems thinking" (three). Finally, yellow covers "higher education" (fourteen) and "curriculum" (four) as key terms.

3.8. Empirical Research in the Field

All the articles in the sample (111) were subjected to bibliometric analysis, while the content analysis focused exclusively on empirical papers (60). The thematic categories and subcategories that emerged from this analysis are shown in Table 8. Six main thematic categories were identified: "Teaching, learning, and capacity building for sustainability", "Instruments, models, or indicators", "Sustainability and principles for management training", "Sustainable university campuses", "SDGs in general", and "Early childhood". Each of these categories presents subcategories that account for the different subtopics addressed in the publications reviewed. The seventh category, named "Others", comprises works that could not be related to the main categories due to their focus.

Table 8. Thematic categories and subcategories of the empirical articles in the sample.

Thematic Categories (Number of Articles)	Subcategories (Number of Articles)
Teaching, learning, and capacity building for sustainability (29)	Curriculum, extracurricular activities, projects and pedagogical initiatives (23) Teacher training (4) Creation and production of interactive material (1) Youth Mappers (1)
Instruments, models, or indicators (12)	Students' behaviors, perceptions, beliefs, concerns and level of knowledge about SDG issues (7) Indicators of HEI contribution to the SDGs (1) Impact of environmental education (1) Barriers to innovation and sustainability in universities according to their representatives (1) Energy sustainability in campus teaching and dissemination activities (1) Impact of online courses on sustainable development (1)
Sustainable university campuses (5)	Environmentally sustainable practices and their benefits (2) Air quality (1) Sustainable mobility (1) Organizational learning (1)
Sustainability and principles for management training (4)	PRME and social responsibility (2) Agenda 2030 through student organizations in business and management (2)
General SDGs (4)	Safe and inclusive school environments (2) Intercultural university (1) Disability (1)
Early childhood (2)	Early childhood education for sustainability programs (1) Child development: development and evaluation of online training (1)
Others (4)	Librarians and their role in achieving SDGs (1) Strategic plan for institutional development (1) Communication/understanding and its relation to SDG4 (1) Community colleges and technical and vocational education and training institutions: contributions to sustainability (1)

4. Discussion

According to the results, although the SDGs were proposed in 2015, a Latin American author's first publication on the subject appeared in 2016. The results revealed that it took time to attract the interest of academics and researchers in the region in studying this field. Despite this, and at general levels, since 2016, a considerable increase in scientific production has been evidenced, reaching a peak of 30 articles in 2020. Although bibliometric studies with different scopes and periods can be found in the literature, they all concur that there is an upward trend in the production of knowledge on the SDGs in the field of education (e.g., [4,8,19]), which leads to an expectation of an auspicious development and consolidation of the field of study in the years to come, both globally and regionally.

Upon analyzing the papers in the sample (111), it was found that all of them corresponded to articles. This trend had already been reported in the work of Grosseck et al. [8], who found that this document format was the primary means of communicating scientific information in the field globally. Moreover, English was the most commonly used language. This can be explained by at least two reasons: (1) in general, this language is dominant in scholarly communication in different scientific disciplines, within which social sciences are included [27,51], and (2) WoS is known to index mostly journals managed by companies in the Global North, which means there is an overrepresentation of English-language journals [52,53]. In this regard, examining whether this trend continues when considering other databases would be fascinating.

Brazil is by far the most productive and influential nation in the region. This Latin American country has proven to have a consolidated research community that has developed and encouraged the discussion of the SDGs. For good reason, Brazil's universities and academics dominate the rankings of productivity and influence. The fact that Brazil is a relevant source of scientific contributions in this field may be due to the relationship between education and sustainability being present as a requirement in its Federal Constitution [54], which has prompted educational institutions to adapt their internal processes, infrastructure, and organizational culture, and to implement practices in pursuit of achieving sustainability [55].

Regarding international collaboration measured by co-authorship of publications, the results overall indicate good levels of cooperation, with approximately 42.34% of the articles in the sample being written with collaboration between researchers from different countries. Despite this, only Brazil and Mexico show outstanding scientific cooperation with countries in the Global North, which leads to the inference that the rest tend to collaborate with countries within the region. While it is known that these collaborations are often restricted by geographic proximity and cultural and linguistic ties, working with researchers from other origins could provide comprehensive strategies and practices to address challenges in the educational field [56]. Furthermore, in sustainability, it is imperative "to integrate the collaborative and multidisciplinary view, in order to accumulate useful and different sources of knowledge to achieve interesting results" [57] (p. 12). For this reason, a call is made to the rest of the Latin American countries to expand their networks and therefore become more recognized, thereby increasing their influence at the global level and having a more profound impact on academia [58].

Most of these articles (97.30%) were published in education journals, with a smaller percentage in specialized higher education journals (33.33%). Likewise, when considering the country of origin, 67.57% of the articles were published in European journals, and 49.55% were published in SSCI or SCIE-indexed journals (13 journals). In terms of visibility, the latter may be a good development since both indexes hold a "higher prestige" than ESCI by having an Impact Factor in Clarivate Analytics, which in turn is recognized for having an evaluation process that involves multiple criteria, some of the key aspects of which are publication standards (quality), editorial content, international diversity, and journal citations [59].

Regarding the most productive journals, IJSHE and IJME led this category. Although both journals are international, prestigious, of high impact (both Q1) and have English as their language of publication, they differ in their objectives and scope, the former focusing on developments and trends in sustainability in the context of higher education. At the same time, the latter focuses on all facets of teaching and learning in business and management. The study by Prieto-Jiménez et al. [19], who analyzed the global production of SDGs in education, also found that these journals ranked first and second in productivity; therefore, the findings of this study are consistent with previous works. However, when assessing levels of influence, the authors also proposed naming MT and ECE as the leading journals in the field.

The analyses evidenced the presence of researchers who can become key players in developing research strategies. At an individual level, Professor Luciana Londero Brandli is the most productive and influential among her peers. Her research specialties are sustainability in higher education, the 2030 agenda, climate change, education for sustainability, and sustainable cities. This researcher is associated with the Universidade de Passo Fundo (Brazil), which incidentally is considered the most productive institution. This university has been highlighted internationally for its commitment to sustainability, recognizing the different practical actions that have been carried out on its campuses, and the university's contributions to the state of the art.

Key documents were identified from the sample that have shaped the discussion around the SDGs in the field of education. These have focused on analyzing and discussing various aspects of the SDGs (e.g., university actions, PRME, student organizations,

efficiency approaches, and publications on the subject). Likewise, it was observed that the most influential papers are those written in English and published in international journals with high impact levels. Most of them at least involved the participation of three researchers. These findings strengthen the idea that publishing papers in journals indexed in SSCI or SCIE and generating scientific networks and communities can improve the authors' visibility and levels of influence. Furthermore, the reason that non-English articles suffer from low citations in both the sciences and social sciences [60] may be due to the fact that most scientists can read English, and therefore they may cite English journals and articles, thus evidencing a language barrier that complicates citations of scientific papers written in other languages [51].

In co-citation efforts, UNESCO stands at the center of the map as the most co-cited author; this is not surprising considering that this agency has been one of the foremost advocates of SDG research and practice at global levels [8]. The UN and OECD also figure alongside it in the rankings of the ten most prolific authors. Prieto-Jiménez et al. [19] found this same trend in their study, and argue that this level of involvement may exist because sustainable development has been established as the framework for action by many international agencies, which has prompted the interest of academics and researchers and the general public. Similarly, within the key documents that appear to be linked to the origin of the publications (through co-citation), one of the six papers has been recognized as a seminal work [43], as it has been equally highlighted in analyses conducted at global levels [2,8].

Co-occurrence analysis allows for exploring relevant thematic foci through the authors' keywords in their articles [8]. VOSviewer detected four clusters: the first cluster (identified in red in Figure 6) gathers concepts related to education for sustainable development. Here, it covers issues such as environmental education (e.g., [61,62]) and education in responsible management [35,63]. The green cluster mainly contains papers that have knowledge management as a core theme. Among the topics discussed are knowledge management frameworks that can be applied to achieve the 2030 Agenda [9], and active methodologies and knowledge management as a mechanism to foster creativity and innovation in the classroom [64].

Meanwhile, the blue cluster could be referred to as containing information about SDGs in general. This group includes papers that discuss aspects such as human rights, mainly contextualized in the medical [30], criminal [65], and teaching [66] fields. Systemic thinking, understood as the ability to analyze complex sustainability problems from a holistic and integrative perspective [67], is also relevant in this group. Finally, the yellow cluster includes curriculum-related issues. Here, for example, the areas of sustainability that are prioritized by the Chilean school curriculum [5], the content of curricula oriented to sustainable development [68], and the degree of curricular environmentalization in undergraduate courses at a Brazilian university [69] are addressed.

The results obtained from the cluster analysis coincide to a large extent with the findings of Prieto-Jiménez et al. [19]. Both studies found that aspects related to education for sustainable development (both from the environmental and management point of view), the curriculum in higher education, and human rights were relevant lines or strands of research. This shows that what is being studied in Latin America is very much in line with discussions being held on the subject at the global level.

Across the sample, 54.05% of the articles correspond to empirical works. Among the prevailing categories are "Teaching, learning, and capacity building for sustainability" and "Instruments, models, or indicators". The first category is mainly driven by research focused on educational institutions' initiatives to foster fulfillment of the 2030 Agenda. Research usually addresses this from an internal perspective (curricular design, internal projects, among others) and from a more collaborative perspective, i.e., through the generation of networks with public, social, and private organizations (e.g., [67,70–72]). The second category, in contrast, seeks to "measure" specific attributes related to the SDGs. The primary subcategory within this category is focused on students, aiming to discover their

behaviors, perceptions, beliefs, concerns, and knowledge about issues related to the SDGs (e.g., [73–76]).

5. Conclusions

This study conducted a review of Latin American scientific production within WoS that is focused on the SDGs in the field of education. It aimed to provide insight into the major trends that characterize this field of study, thus forming a basis for academics wishing to engage in this topic.

Latin American production has increased in recent years; nevertheless, contributions remain marginal at global levels. Moreover, Brazil is the primary driver of knowledge generation in the region, leaving plenty of room for the emergence of agents from other contexts to contribute new perspectives, ideas, and approaches to the debate.

Among the empirical works, two main lines of research were observed. The first is related to institutional initiatives to promote the 2030 Agenda in aspects such as curriculum, extracurricular activities, pedagogical projects, and initiatives; the other focuses on the behaviors, perceptions, beliefs, concerns, and levels of knowledge of students around issues related to the SDGs. Some gaps were detected in the existing knowledge in this type of study; for example, the research is usually contextualized in the university sector, and other educational levels, such as primary, secondary, and technical education, are relegated. Regarding topics, there is a lack of studies that address aspects related to gender equality, global citizenship, access to education, the effects of the COVID-19 pandemic on the progress of the SDGs, the adaptation of organizational structures (e.g., roles, leadership, and culture), national policies on the subject, and their effects on educational institutions, among others.

The SDGs are a developing field that still has a long journey ahead, so promoting theoretical research and practical applications of these principles is imperative for educational institutions in the region to remain aligned with global requirements; adaptation, flexibility, and the integration of the environmental, economic, and social dimensions in their work are required, in addition to the education of students to transform them into critical and global citizens.

6. Limitations

Firstly, the study focuses exclusively on publications in WoS-indexed journals. Although this is a database that enjoys great international prestige, there are others, such as Scopus and Google Scholar, that have more comprehensive scientific coverage. Other indexes include publications from developing countries (e.g., SciELO), and have become a reference in regions such as Latin America. Consequently, future work could analyze the scientific production of other databases to contribute to a better view of the field of study.

Another limitation arises from the time analyzed. Although the SDGs were proposed in 2015, this does not mean there was no scientific production related to the topic in previous years. Therefore, future research could expand the period of analysis and thus obtain a clearer view of the evolving nuances of the field.

Finally, the categorization of topics has a strong subjective component, and it may be that in creating them, generalizations have been made that lead to a loss of information. Thus, future work could focus only on one category, broadening the scope of the study and carrying out a much more in-depth analysis.

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References

1. Lomazzi, M.; Borisch, B.; Laaser, U. The Millennium Development Goals: Experiences, achievements and what's next. *Glob. Health Action* **2014**, *7*, 23695. [CrossRef] [PubMed]
2. Hallinger, P.; Chatpinyakoop, C. A bibliometric review of research on higher education for sustainable development, 1998–2018. *Sustainability* **2019**, *11*, 2401. [CrossRef]
3. Rebelatto, B.G.; Lange Salvia, A.; Reginatto, G.; Daneli, R.C.; Brandli, L.L. Energy efficiency actions at a Brazilian university and their contribution to sustainable development Goal 7. *Int. J. Sustain. High. Educ.* **2019**, *20*, 842–855. [CrossRef]
4. Avelar, A.B.A.; da Silva-Oliveira, K.D.; da Silva Pereira, R. Education for advancing the implementation of the Sustainable Development Goals: A systematic approach. *Int. J. Manag. Educ.* **2019**, *17*, 100322. [CrossRef]
5. Berríos-Villarroel, A.; Orellana-Fernández, R.; Bastías-Bastías, L.S. Desarrollo sostenible y currículo chileno de enseñanza secundaria: ¿Qué proponen los programas escolares? *Rev. Electr. Educare* **2021**, *25*, 333–355. [CrossRef]
6. Franco, I.; Saito, O.; Vaughter, P.; Whereat, J.; Kanie, N.; Takemoto, K. Higher education for sustainable development: Actioning the global goals in policy, curriculum and practice. *Sustain. Sci.* **2019**, *14*, 1621–1642. [CrossRef]
7. Blanco-Portela, N.; R-Pertierra, L.; Benayas, J.; Lozano, R. Sustainability leaders' perceptions on the drivers for and the barriers to the integration of sustainability in Latin American higher education institutions. *Sustainability* **2018**, *10*, 2954. [CrossRef]
8. Grosseck, G.; Țîru, L.G.; Bran, R.A. Education for sustainable development: Evolution and perspectives: A bibliometric review of research, 1992–2018. *Sustainability* **2019**, *11*, 6136. [CrossRef]
9. Barrantes Briceño, C.; Almada Santos, F. Knowledge management, the missing piece in the 2030 agenda and SDGs puzzle. *Int. J. Sustain. High. Educ.* **2019**, *20*, 901–916. [CrossRef]
10. Weybrecht, G. From challenge to opportunity—Management education's crucial role in sustainability and the Sustainable Development Goals—An overview and framework. *Int. J. Manag. Educ.* **2017**, *15*, 84–92. [CrossRef]
11. Annan-Diab, F.; Molinari, C. Interdisciplinarity: Practical approach to advancing education for sustainability and for the Sustainable Development Goals. *Int. J. Manag. Educ.* **2017**, *15*, 73–83. [CrossRef]
12. UNESCO. *Education 2030: Incheon Declaration and Framework for Action for the Implementation of Sustainable Development Goal 4: Ensure Inclusive and Equitable Quality Education and Promote Lifelong Learning Opportunities for All*; UNESCO: Paris, France, 2016. Available online: https://unesdoc.unesco.org/ark:/48223/pf0000245656 (accessed on 5 January 2023).
13. Hanemann, U. Examining the application of the lifelong learning principle to the literacy target in the fourth Sustainable Development Goal (SDG 4). *Int. Rev. Educ.* **2019**, *65*, 251–275. [CrossRef]
14. González García, E.; Colomo Magaña, E.; Cívico Ariza, A. Quality education as a sustainable development goal in the context of 2030 agenda: Bibliometric approach. *Sustainability* **2020**, *12*, 5884. [CrossRef]
15. Unterhalter, E. The many meanings of quality education: Politics of targets and indicators in SDG 4. *Glob. Policy* **2019**, *10*, 39–51. [CrossRef]
16. Donthu, N.; Kumar, S.; Mukherjee, D.; Pandey, N.; Lim, W.M. How to conduct a bibliometric analysis: An overview and guidelines. *J. Bus. Res.* **2021**, *133*, 285–296. [CrossRef]
17. Mukherjee, D.; Lim, W.M.; Kumar, S.; Donthu, N. Guidelines for advancing theory and practice through bibliometric research. *J. Bus. Res.* **2022**, *148*, 101–115. [CrossRef]
18. Zupic, I.; Čater, T. Bibliometric methods in management and organization. *Organ. Res. Methods* **2015**, *18*, 429–472. [CrossRef]
19. Prieto-Jiménez, E.; López-Catalán, L.; López-Catalán, B.; Domínguez-Fernández, G. Sustainable development goals and education: A bibliometric mapping analysis. *Sustainability* **2021**, *13*, 2126. [CrossRef]
20. Fauzi, M.A.; Abdul Rahman, A.R.; Lee, C.K. A systematic bibliometric review of the United Nation's SDGS: Which are the most related to higher education institutions? *Int. J. Sustain. High. Educ.* **2023**, *24*, 637–659. [CrossRef]
21. UNESCO; CEPAL; UNICEF. *La Encrucijada de la Educación en América Latina y el Caribe. Informe Regional de Monitoreo ODS4-Educación 2030*. UNESCO: Paris, France, 2022. Available online: https://unesdoc.unesco.org/ark:/48223/pf0000382636 (accessed on 4 April 2023).
22. Rampasso, I.S.; Anholon, R.; Quelhas, O.L.G.; Velazquez, L.; Mac-Lean, C. Guest editorial: Latin American perspectives on sustainability in higher education. *Int. J. Sustain. High. Educ.* **2023**, *24*, 233–234. [CrossRef]
23. Pedraja-Rejas, L.; Muñoz-Fritis, C.; Araneda-Guirriman, C. Tendencias en la educación terciaria: Género y academia. *Rev. Venez. Gerenc.* **2022**, *27*, 1788–1810.
24. Bernatović, I.; Slavec Gomezel, A.; Černe, M. Mapping the knowledge-hiding field and its future prospects: A bibliometric co-citation, co-word, and coupling analysis. *Knowl. Manag. Res. Pract.* **2022**, *20*, 394–409. [CrossRef]
25. Liu, W. The data source of this study is Web of Science Core Collection? Not enough. *Scientometrics* **2019**, *121*, 1815–1824. [CrossRef]

26. Huang, Y.; Zhu, D.; Lv, Q.; Porter, A.L.; Robinson, D.K.; Wang, X. Early insights on the Emerging Sources Citation Index (ESCI): An overlay map-based bibliometric study. *Scientometrics* **2017**, *111*, 2041–2057. [CrossRef]
27. Liu, W. The changing role of non-English papers in scholarly communication: Evidence from Web of Science's three journal citation indexes. *Learn. Publ.* **2017**, *30*, 115–123. [CrossRef]
28. Van Eck, N.J.; Waltman, L. Citation-based clustering of publications using CitNetExplorer and VOSviewer. *Scientometrics* **2017**, *111*, 1053–1070. [CrossRef]
29. Alarcon-Ruiz, C.A.; Diaz-Barrera, M.E.; Vera-Monge, V.A.; Alva-Diaz, C.; Metcalf, T. A bibliometric analysis of the Latin American research on stroke 2003–2017. *World Neurosurg.* **2019**, *129*, 545–554. [CrossRef]
30. Shaw, E.; Walpole, S.; McLean, M.; Alvarez-Nieto, C.; Barna, S.; Bazin, K.; Behrens, G.; Chase, H.; Duane, B.; El Omrani, O.; et al. AMEE consensus statement: Planetary health and education for sustainable healthcare. *Med. Teach.* **2021**, *43*, 272–286. [CrossRef]
31. Veiga Ávila, L.; Beuron, T.A.; Brandli, L.L.; Damke, L.I.; Pereira, R.S.; Klein, L.L. Barriers to innovation and sustainability in universities: An international comparison. *Int. J. Sustain. High. Educ.* **2019**, *20*, 805–821. [CrossRef]
32. Barros, M.V.; Puglieri, F.N.; Tesser, D.P.; Kuczynski, O.; Piekarski, C.M. Sustainability at a Brazilian university: Developing environmentally sustainable practices and a life cycle assessment case study. *Int. J. Sustain. High. Educ.* **2020**, *21*, 841–859. [CrossRef]
33. Rivas, D.F.; Boffito, D.C.; Faria-Albanese, J.; Glassey, J.; Afraz, N.; Akse, H.; Boodhoo, K.V.K.; Bos, R.; Cantin, J.; Chiang, Y.W.; et al. Process intensification education contributes to sustainable development goals. Part 1. *Educ. Chem. Eng.* **2020**, *32*, 1–14. [CrossRef]
34. Rivas, D.F.; Boffito, D.C.; Faria-Albanese, J.; Glassey, J.; Cantin, J.; Afraz, N.; Akse, H.; Boodhoo, K.V.K.; Bos, R.; Chiang, Y.W.; et al. Process intensification education contributes to sustainable development goals. Part 2. *Educ. Chem. Eng.* **2020**, *32*, 15–24. [CrossRef]
35. de Paula Arruda Filho, N. The agenda 2030 for responsible management education: An applied methodology. *Int. J. Manag. Educ.* **2017**, *15*, 183–191. [CrossRef]
36. Borges, J.C.; Cezarino, L.O.; Ferreira, T.C.; Sala, O.T.M.; Unglaub, D.L.; Caldana, A.C.F. Student organizations and communities of practice: Actions for the 2030 agenda for sustainable development. *Int. J. Manag. Educ.* **2017**, *15*, 172–182. [CrossRef]
37. Borges, J.C.; Ferreira, T.C.; de Oliveira, M.S.B.; Macini, N.; Caldana, A.C.F. Hidden curriculum in student organizations: Learning, practice, socialization and responsible management in a business school. *Int. J. Manag. Educ.* **2017**, *15*, 153–161. [CrossRef]
38. Gil-Barragan, J.M.; Aguilera-Castillo, A.; Suárez Galeano, L. A Bibliometric Analysis of China-Latin America Economic and Political Relations. *Lat. Am. Policy* **2020**, *11*, 290–312. [CrossRef]
39. Leal Filho, W.; Shiel, C.; Paço, A.; Mifsud, M.; Ávila, L.V.; Brandli, L.L.; Molthan-Hill, P.; Pace, P.; Azeiteiro, U.M.; Ruiz Vargas, V.; et al. Sustainable Development Goals and sustainability teaching at universities: Falling behind or getting ahead of the pack? *J. Clean. Prod.* **2019**, *232*, 285–294. [CrossRef]
40. Parkes, C.; Buono, A.F.; Howaidy, G. The principles for responsible management education (PRME): The first decade–What has been achieved? The next decade–Responsible management Education's challenge for the Sustainable Development Goals (SDGs). *Int. J. Manag. Educ.* **2017**, *15*, 61–65. [CrossRef]
41. Ávila, L.V.; Leal Filho, W.; Brandli, L.; Macgregor, C.J.; Molthan-Hill, P.; Özuyar, P.G.; Moreira, R.M. Barriers to innovation and sustainability at universities around the world. *J. Clean. Prod.* **2017**, *164*, 1268–1278. [CrossRef]
42. Kolb, M.; Fröhlich, L.; Schmidpeter, R. Implementing sustainability as the new normal: Responsible management education–From a private business school's perspective. *Int. J. Manag. Educ.* **2017**, *15*, 280–292. [CrossRef]
43. Lozano, R.; Lukman, R.; Lozano, F.J.; Huisingh, D.; Lambrechts, W. Declarations for sustainability in higher education: Becoming better leaders, through addressing the university system. *J. Clean. Prod.* **2013**, *48*, 10–19. [CrossRef]
44. Aleixo, A.M.; Leal, S.; Azeiteiro, U.M. Conceptualization of sustainable higher education institutions, roles, barriers, and challenges for sustainability: An exploratory study in Portugal. *J. Clean. Prod.* **2018**, *172*, 1664–1673. [CrossRef]
45. Alonso-Almeida, M.D.M.; Marimon, F.; Casani, F.; Rodriguez-Pomeda, J. Diffusion of sustainability reporting in universities: Current situation and future perspectives. *J. Clean. Prod.* **2015**, *106*, 144–154. [CrossRef]
46. Lozano, R.; Ceulemans, K.; Alonso-Almeida, M.; Huisingh, D.; Lozano, F.J.; Waas, T.; Lambrechts, W.; Lukman, R.; Hugé, J. A review of commitment and implementation of sustainable development in higher education: Results from a worldwide survey. *J. Clean. Prod.* **2015**, *108*, 1–18. [CrossRef]
47. Lozano, R.; Merrill, M.Y.; Sammalisto, K.; Ceulemans, K.; Lozano, F.J. Connecting competences and pedagogical approaches for sustainable development in higher education: A literature review and framework proposal. *Sustainability* **2017**, *9*, 1889. [CrossRef]
48. Barber, N.A.; Wilson, F.; Venkatachalam, V.; Cleaves, S.M.; Garnham, J. Integrating sustainability into business curricula: University of New Hampshire case study. *Int. J. Sustain. High. Educ.* **2014**, *15*, 473–493. [CrossRef]
49. Haertle, J.; Parkes, C.; Murray, A.; Hayes, R. PRME: Building a global movement on responsible management education. *Int. J. Manag. Educ.* **2017**, *15*, 66–72. [CrossRef]
50. Storey, M.; Killian, S.; O'Regan, P. Responsible management education: Mapping the field in the context of the SDGs. *Int. J. Manag. Educ.* **2017**, *15*, 93–103. [CrossRef]
51. Liang, L.; Rousseau, R.; Zhong, Z. Non-English journals and papers in physics and chemistry: Bias in citations? *Scientometrics* **2013**, *95*, 333–350. [CrossRef]

52. Guzmán-Valenzuela, C.; Rojas-Murphy Tagle, A.; Gómez-González, C. Polifonía epistémica de la investigación sobre las experiencias estudiantiles: El caso Latinoamericano. *Educ. Policy Anal. Arch.* **2020**, *28*, 96. [CrossRef]
53. Vera-Baceta, M.A.; Thelwall, M.; Kousha, K. Web of Science and Scopus language coverage. *Scientometrics* **2019**, *121*, 1803–1813. [CrossRef]
54. Veiga Ávila, L.; Rossato Facco, A.L.; Bento, M.H.D.S.; Arigony, M.M.; Obregon, S.L.; Trevisan, M. Sustainability and education for sustainability: An analysis of publications from the last decade. *Environ. Qual. Manag.* **2018**, *27*, 107–118. [CrossRef]
55. Berchin, I.I.; Grando, V.D.S.; Marcon, G.A.; Corseuil, L.; Guerra, J.B.S.O.D.A. Strategies to promote sustainability in higher education institutions: A case study of a federal institute of higher education in Brazil. *Int. J. Sustain. High. Educ.* **2017**, *18*, 1018–1038. [CrossRef]
56. Hernández-Torrano, D.; Somerton, M.; Helmer, J. Mapping research on inclusive education since Salamanca Statement: A bibliometric review of the literature over 25 years. *Int. J. Incl. Educ.* **2022**, *26*, 893–912. [CrossRef]
57. García-González, A.; Ramírez-Montoya, M.S. Systematic mapping of scientific production on open innovation (2015–2018): Opportunities for sustainable training environments. *Sustainability* **2019**, *11*, 1781. [CrossRef]
58. Pedraja-Rejas, L.; Rodríguez-Ponce, E.; Muñoz-Fritis, C. Human resource management and performance in Ibero-America: Bibliometric analysis of scientific production. *Cuad. Gest.* **2022**, *22*, 123–137. [CrossRef]
59. Li, Y. Five years of development in pursuing excellence in quality and global impact to become the first journal in STEM education covered in SSCI. *Int. J. STEM Educ.* **2019**, *6*, 42. [CrossRef]
60. Liu, F.; Hu, G.; Tang, L.; Liu, W. The penalty of containing more non-English articles. *Scientometrics* **2018**, *114*, 359–366. [CrossRef]
61. Gavilanes, R.; Tipán, B. La educación ambiental como estrategia para enfrentar el cambio climático. *Alteridad* **2021**, *16*, 286–298. [CrossRef]
62. Moncada Rangel, J.A.; Paredes Chacín, I.M.; Aranguren Carrera, J.R. Aportes a la educación ambiental para la sustentabilidad desde la Facultad de Posgrado de la Universidad Técnica del Norte, Ecuador. *REMEA-Rev. Eletronica Mestr. Educ. Ambient.* **2022**, *39*, 159–175. [CrossRef]
63. Avelar, A.B.A.; da Silva-Oliveira, K.D.; Farina, M.C.; Pereira, R.d.S. Contribution of PRME in education, research, and outreach in Brazilian higher education institutions. *Int. J. Sustain. High. Educ.* **2022**, *23*, 283–300. [CrossRef]
64. Nóbile, C.I.; Gauna Domínguez, C.D.V.; Aude Berozonce, M.P.; Pérez, J. Metodologías activas y gestión del conocimiento para promover la creatividad y la innovación en el aula. *Innoeduca Int. J. Technol. Educ. Innov.* **2021**, *7*, 61–74. [CrossRef]
65. León, D.O.; Ojeda, M.E.B. Hacia el desarrollo sostenible: La educación en derechos humanos en la formación de especialistas en Derecho Penal. *Rev. Educ. Derecho* **2021**, *1 Extraordinario*, 145–167. [CrossRef]
66. Vogelfanger, A.D. La formación en derechos humanos y desarrollo sostenible de los docentes de educación primaria de la ciudad de Buenos Aires. *Rev. Educ. Derecho* **2021**, *1 Extraordinario*, 34–64. [CrossRef]
67. Meza Rios, M.M.; Herremans, I.M.; Wallace, J.E.; Althouse, N.; Lansdale, D.; Preusser, M. Strengthening sustainability leadership competencies through university internships. *Int. J. Sustain. High. Educ.* **2018**, *19*, 739–755. [CrossRef]
68. Friman, M.; Schreiber, D.; Mutanen, A.; Perälä, S.; Salminen, J. Wicked problems: University research topic convergence despite divergence in local educational and innovation policies. *Int. J. Sustain. High. Educ.* **2021**, *22*, 108–124. [CrossRef]
69. Hidalgo López, C. Factores metodológicos para la ambientalización curricular universitaria. *Rev. Contemp. Educ.* **2021**, *16*, 181–209. [CrossRef]
70. de Paula Arruda Filho, N.; Hino, M.C.; Beuter, B.S.P. Including SDGs in the education of globally responsible leaders. *Int. J. Sustain. High. Educ.* **2019**, *20*, 856–870. [CrossRef]
71. Gómez Zermeño, M.G.; de la Garza, L.Y.A. Open laboratories for social innovation: A strategy for research and innovation in education for peace and sustainable development. Sustainable development is an issue of high relevance for all countries, and universities play a fundamental role in promotin. *Int. J. Sustain. High. Educ.* **2021**, *22*, 344–362. [CrossRef]
72. Wood, T., Jr.; Pansarella, L. Inside the borders but outside the box: An immersion program aligned with the PRME and the SDG to foster reflexivity. *Int. J. Manag. Educ.* **2019**, *17*, 100306. [CrossRef]
73. Avelar, A.B.A.; Farina, M.C. The relationship between the incorporation of sustainability in higher education and the student's behavior: Self-reported sustainable behavior scale. *Int. J. Sustain. High. Educ.* **2022**, *23*, 1749–1767. [CrossRef]
74. Franco, D.; Macke, J.; Cotton, D.; Paço, A.; Segers, J.-P.; Franco, L. Student energy-saving in higher education tackling the challenge of decarbonization. *Int. J. Sustain. High. Educ.* **2022**, *23*, 1648–1666. [CrossRef]
75. Munguia, N.; Romero, A.; Anaya-Eredias, C.; Perkins, K.M.; Velazquez, L. Global warming in the minds of Mexican higher education students: An exploratory study. *Int. J. Sustain. High. Educ.* **2023**, *24*, 317–338. [CrossRef]
76. Torres Oliveros, S.A.; Salcedo Ospino, J.; Bustamante Meza, L. Sostenibilidad y educación en el área de tecnología e informática. *Praxis* **2018**, *14*, 253–263. [CrossRef]

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