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Analysis of the world scientific production on educational psychology (2000-2022)

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Abstract--The aim of the study was to characterize the world scientific production on Educational Psychology in the Scopus and Web of Science databases, between January 2000 and January 2022. We worked with a universe of 526 documents from the WoS database and 829 from Scopus, extracted from 167 and 316 sources respectively. Regarding the number of authors, Scopus presents 1336 and WoS, 925. Single-authored documents total 294 in Scopus and 229 in WoS. The collaboration index between authors is slightly higher in WoS (2.64) compared to 2.39 in Scopus. The authors Mok, M. and Mackay T., and the journals Educational and child psychology and Psychiatria Danubina stand out. The United States is the most productive country in terms of scientific evidence. The type of scientific production that stands out the most is original articles. The growth of scientific production is corroborated by the emergence of the pandemic and its impact on education, requiring the support of psychology.

Keywords--bibliometric indicators, scientific production, educational psychology.

Introduction

Educational psychology focuses on the laws of change in the knowledge, skills, and individual psychology of learners in the process of education and teaching (Xu et al., 2022). This branch of psychology involves the study of how people learn, including teaching methods, instructional processes, and individual differences in learning. Its goal as a discipline is to understand how people learn and retain new information. To do this, practitioners focus on analyzing psychological phenomena and the laws of the basic principles of the psychology of learning and teaching (Gray et al., 2018). Educational psychologists apply theories of human development to understand individual learning and inform the instructional process. Therefore, educational psychology is considered a bridging discipline (Coll, 2001a, 2001b) as it seeks to establish relationships with other areas of psychology. However, there are three dimensions that differentiate it (Díaz et al., 2006): theoretical-conceptual, technological-instrumental and technical-practical. These three dimensions allow educational psychology to generate proposals close to educational realities as well as to establish parity among practical educational discourses. Teaching and learning of students is a process that educational psychologists relate to psychological development processes such as intelligence, personality, ideology, morality, and knowledge and skills. The teaching and learning process cannot be separated from the activities of the teacher, who is responsible for enhancing initiatives that help students learn better (Hilper & Marchand, 2018) who, in addition to being the object of education, are subjects of education (Xu et al., 2022).

Currently, there are important studies within educational psychology that have received special attention due to the scope and relevance of their findings. For example, studies focused on using effective learning techniques that help improve student learning (Dunlosky et al., 2013), the analysis and effectiveness of certain forms of learning such as cooperative (formal and informal cooperative learning and in cooperative groups) (Jhonson & Jhonson, 2009), studies focused on analyzing electronic discourses in computer-mediated learning processes (Hara et al., 2000), the planning and organization processes of teachers' learning activities that help the integration of children with special needs in particular contexts (Emmer & Stough, 2001) and those related to inclusive education (Lindsay, 2007). Taking into account the changes that have occurred in recent years in the educational sector due to the incorporation of new learning technologies and their impact on student behavior, it is necessary to account for the progress of knowledge in the field of educational psychology. For this reason, this paper aims to characterize the research devoted to the study of problems of interest to educational psychology from a bibliometric perspective. Bibliometric analysis is defined as a statistical evaluation of scientific articles, books or chapters of a published book, and is an effective way of measuring the influence of the publication in the scientific community (Moya-Anegón et al., 2007). Its interest is focused on evaluating the overall scientific production, scientific production by country, language, citations, author affiliations, journal impact factor, research areas and keywords, in order to assess and quantify the volume of work generated on a particular topic and its rate of development (Mao et al., 2018; Soosaraei et al., 2018).

Under this concept, the specific objectives of the study are, first, to provide bibliometric information on Educational Psychology in the Scopus and Web of Science (hereinafter WoS) databases, to list the most cited articles in the selected databases, to specify the authors with the highest scientific production on Educational Psychology, to specify the scientific journals with the highest number of articles on the subject, to indicate the types of publication with the highest presence in the databases analyzed and to determine the countries with the highest production of scientific papers on the subject in the databases analyzed.

Material and Methods

The present study is based on bibliometrics, with a descriptive and retrospective scope, considering as the unit of study the world scientific production generated on Educational Psychology in the period from 2000 to 2022. The Scopus and WoS databases were considered for the study. Their bibliometric indicators were calculated using Bibliometrix R software and the managers of these databases. These two databases were chosen because they are dominated by documents that contribute to the elaboration of maps related to the dynamics of scientific publications in different disciplines. The WoS database is one of the oldest databases whose articles generate a greater academic impact worldwide. In the case of the Scopus database, it is the database with the largest directory of scientific publications in the world (Pérez, 2017).

As for the search strategies, the formula TITLE (educational AND psychology) AND (LIMIT-TO (PUBYEAR , 2022-2000)) was used, adapting it to the characteristics of the searches in each software and database. The results were reviewed individually, forming a final sample of 526 documents extracted from WoS and 829 from Scopus. The data obtained were exported in RIS and CSV formats and then processed and analyzed using Bibliometrix R software and VosViewer software. The bibliometric indicators considered for the research were based on general information on data, authors and author collaboration. The results were presented in tables and figures in order to address the stated objective.

Results

Table 1 shows the information regarding the main bibliometric indicators extracted from the Bibliometrix R software on Educational Psychology. A total of 526 documents were obtained from the WoS database and 829 from Scopus, extracted from 167 and 316 sources respectively, generating a very similar average number of citations of 10.42 for WoS and 10.38 for Scopus. The average number of citations per document is also similar and close to unity, being 0.9639 and 0.9207 in WoS and Scopus. In terms of the number of authors, Scopus presents 1336 and WoS, 925. Single-author papers total 294 in Scopus and 229 in WoS. The rest of the documents have multiple authors (in both databases there are around two). The collaboration index between authors is slightly higher in WoS (2.64) compared to 2.39 in Scopus. Finally, WoS presents 631 keywords and Scopus 546.

Table 1
Main bibliometric information on Educational Psychology in Scopus and WoS
(2000-2022)

Description	WoS	Scopus
Main data information		
Sources	167	316
Documents	526	829
Average number of years since publication	8.67	9.26
Average number of citations per document	10.42	10.38
Average number of citations per year per document	0.9639	0.9207
References	1	1
Authors		
Authors	925	1336
Authors' appearances	1084	1722
Authors of single-authored documents	229	294
Authors of multi-authored documents	696	1042
Collaboration of authors		
Documents by Author	0.569	0.621
Authors per document	1.76	1.61
Co-authors per document	2.06	2.08
Collaboration index	2.64	2.39
Content of the document		
Keywords (ID)	631	546
Author's keywords (DE)	823	1274

Note: Data extracted with the help of Bibliometrix R software (2022).

When analyzing global scientific production by year, Figure 1 shows that Scopus has a higher production, with the greatest differences between 2012 and 2018. However, in 2019, similarly to 2004 and 2008, WoS production is predominant over Scopus. But the year 2021 is the year in which WoS stands out more over Scopus.

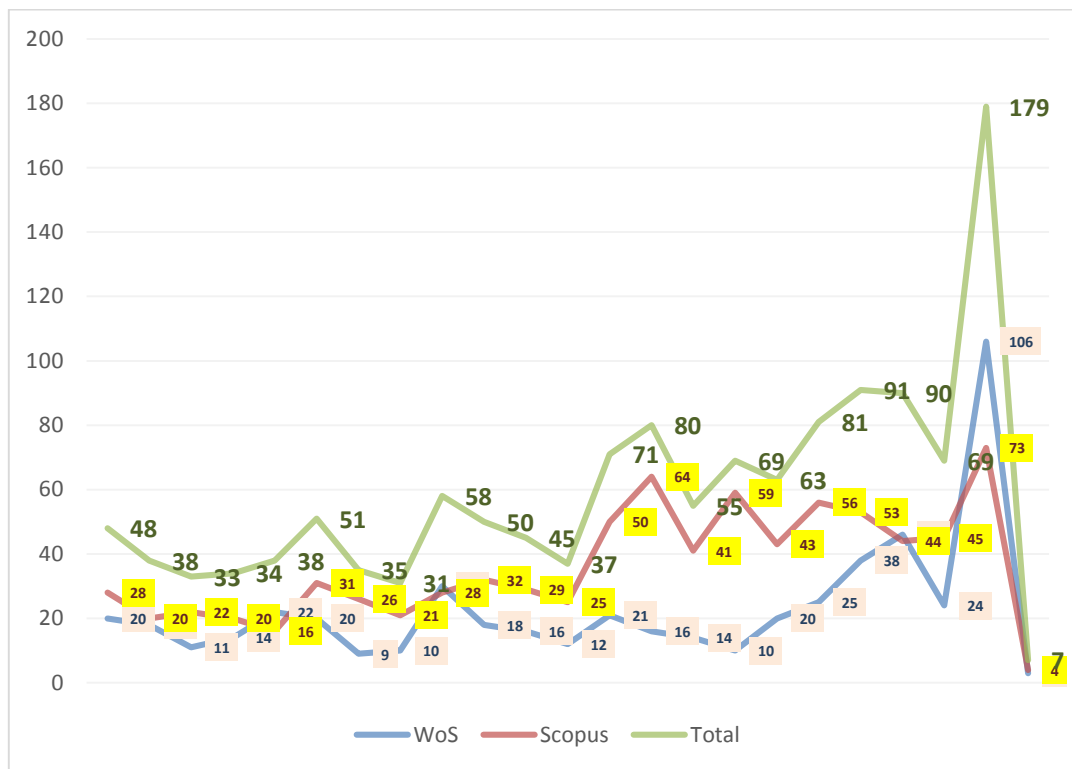


Figure 1. Annual production.
Source: Bibliometrix R (2022)

Table 2 shows the list of the most cited articles in the WoS and Scopus databases. The study by Dunlosky, J., Rawson, K.A., Marsh, E.J., Nathan, M.J., Willingham, D.T., researchers affiliated with the Department of Psychology at Kent State University; the Department of Psychology and Neuroscience at Duke University; the Department of Educational Psychology, the Department of Curriculum and Instruction and the Department of Psychology at the University of Wisconsin-Madison; as well as the Department of Psychology at the University of Virginia, stands out. The study is entitled "Improving Students' Learning with Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology." The article has received 1210 citations in Scopus and 1069 in WoS since its 2013 publication in the journal *Psychological Science in the Public Interest (PSPI)*.

Also noteworthy is the article "Content analysis of online discussion in an applied educational psychology course" by Hara, N; Bonk, CJ & Angeli, C; published in the journal *Instructional Science* in 2000. This publication has 410 citations in WoS and 530 in Scopus. Finally, Johnson, DW and Johnson, RT, wrote the article entitled "An Educational Psychology Success Story: Social Interdependence Theory and Cooperative Learning", which has 788 citations in Scopus and 230 in WoS. The article was published in the journal "Educational researcher" in 2009.

Table 2
Five most cited articles of the scientific production on Educational Psychology in Scopus and WoS

N°	Authors	Title	Quotations		Year	Source
			Scopus	Wos		
1	Dunlosky, J., Rawson, K.A., Marsh, E.J., Nathan, M.J., Willingham, D.T.	Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology.	1210	1069	2013	Psychological Science in the Public Interest, Supplement
2	Johnson, DW and Johnson, RT	An Educational Psychology Success Story: Social Interdependence Theory and Cooperative Learning.	788	230	2009	Educational Researcher
3	Hara, N; Bonk, CJ & Angeli, C	Content analysis of online discussion in an applied educational psychology course	530	410	2000	Instructional Science
4	Emmer, ET and Stough, LM	Classroom management: A critical part of educational psychology, with implications for teacher education.	416	374	2001	Educational Psychologist
5	Lindsay, G	Educational psychology and the effectiveness of inclusive education/mainstreaming	307	328	2007	British Journal of Educational Psychology

The table 3 shows the authors with the highest number of publications. In the case of WoS, Mok, M. stands out as the author with the most publications, while in Scopus, Mackay T. stands out as the author with the most publications on Educational Psychology.

Table 3
Authors with the highest number of publications in WoS and Scopus

	WoS	Scopus	
Mok M.	23	Mackay T	16
Zhang L.F.	23	Frederickson N	9
Martin A.	17	Robinson Dh	9
Phan H.	12	Boyle C	8
Urhahne D.	10	Smith Mc	8

Regarding the journals in which the articles are published, Educational and child Psychology has 71 publications in Scopus, while in WoS the journal Psychiatria Danubina stands out with 55 publications (see Table 3).

Journals with the highest number of publications on educational psychology in WoS and Scopus.

Scopus		WoS	
Educational and Child Psychology	71	Psychiatria Danubina	55
Educational Psychology in Practice	55	Educational Psychologist	43
Educational Psychologist	46	International Journal of Psychology	30
Educational Psychology Review	32	Frontiers in Psychology	24
Frontiers in Psychology	26	Psychologische Rundschau	24

Regarding the types of research (see Table 4), in the two databases analyzed, original scientific articles predominate (245 in WoS and 463 in Scopus), followed by editorials and *reviews*, present in both databases. These results show the importance of communicating original results on the subject compared to documents whose objective is interaction between reader and author, such as letters to the editor.

Table 4
Types of publications in WoS and Scopus

WoS		Scopus	
Article	245	Article	463
Meeting summary	92	Book chapter	105
Editorial	85	Review	71
Bibliographic review	56	Erratum	53
Review	23	Editorial	49

With respect to the countries of origin of the research in both databases, the United States stands out, followed by China and the United Kingdom, which exchange their positions in the Scopus and WoS databases (see Table 5). Figure 2 shows the country of the corresponding author and the intra-country (SCP) and inter-country (MCP) collaboration. The United States leads in both intra-country (SCP) and inter-country (MCP) collaboration, with the number of publications ranging from 133 to 12.

Table 5
Countries of origin of the publications in WoS and Scopus

Scopus		WoS	
United States	514	United States	541
United Kingdom	304	China	262
China	78	United Kingdom	196
Spain	77	Italy	188
Brazil	75	Turkey	100

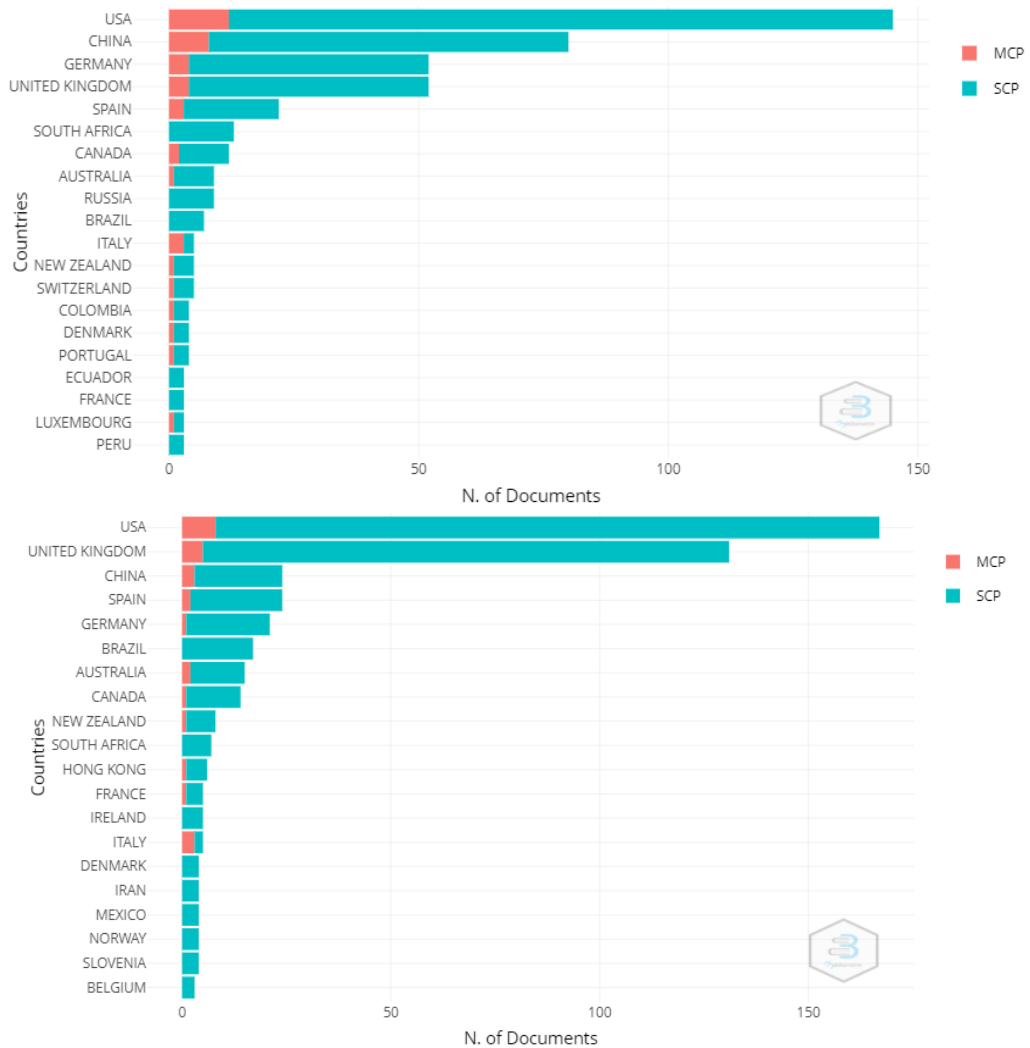


Figure 2. Country of the corresponding author. Intra-country (SCP) and inter-country (MCP) collaboration during 2000-2022.

Finally, regarding the network analysis of the titles and *abstracts of the Scopus database*, we observe the creation of 7 clusters, 51 items, 532 links and a total link strength of 1443. Cluster 1 (red) is born from *educational psychology* with 46 links, cluster 2 (green) with *article* and 40 links, cluster 3 (blue) with *human* and 42 links and cluster 5 (violet) with *psychology* and 44 links (see figure 3).

Discussion

As for the scientific production on educational psychology, a surprising increase in production is observed in the year 2021, probably motivated by research originating from the emergence of the COVID-19 pandemic. However, a growth was already observed since 2016, slightly interrupted in 2020. This is corroborated by Lovakov (2017), who states that in recent years a growth in the number of publications in this subject area is also noticeable. The average number of citations per document is also similar and close to unity, being 0.9639 and 0.9207 in WoS and Scopus. Gallegos et al. (2020) worked with three specific databases: Dialnet (Spain), Redalyc (Mexico) and SciELO (Brazil). Their final refined sample was 81 articles. Quevedo-Blasco et al., (2021) using the time range 2018-2020, screened 17 journals and obtained a total of 1,247 documents (1,071 articles) with 43,697 references. Whereas in the study by Anglada-Tort & Sanfilippo (2019), the literature retrieved comprised a total of 2089 peer-reviewed articles and 2632 authors. Portillo-Salido (2010), using the PubMed database, retrieved information on articles from 15 journals over a 21-year period (1987 to 2007), considering 37540 articles. Finally, Begeny et al. (2018), evaluated 4456 articles published between 2002 and 2016 in eight educational and school psychology journals.

In terms of authorship, Scopus presents 1336 and WoS, 925. Single-authored papers total 294 in Scopus and 229 in WoS. The remaining documents have multiple authorship. The collaboration index between authors is slightly higher in WoS (2.64) compared to 2.39 in Scopus. In Fedorov's (2019) research, it is shown that the number of publications related to post-non-classical psychology is growing steadily over time. For the author, the majority of authors (72%) wrote only one article, which disagrees with the findings of the present research. As for the most prolific authors, the study by Dunlosky, J., Rawson, K.A., Marsh, E.J., Nathan, M.J., Willingham, D.T., entitled "Improving Students' Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology", which has received 1210 citations in Scopus and 1069 in Web of Science, stands out. In the case of WoS, Mok, M. (23) stands out as the author with the most publications. In Scopus, Mackay T. (16). For the research of Xu et al. (2018), Peiwen Zhan, Hu Zhao and Xiaofeng Lu top the list with a total of eighteen articles.

Regarding the top journals that publish research on Educational Psychology, Educational and Child Psychology stands out with 71 publications in Scopus, while in WoS the journal *Psychiatria Danubina* stands out with 55 publications. It is worth noting that in the research by Quevedo-Blasco et al., (2019), on the most influential journals, *The European Journal of Psychology Applied to Legal Context* (3,682) stands out. While for Agudelo et al. (2003), the *International Journal of Clinical and Health Psychology / Revista Internacional de Psicología Clínica y de la Salud / International Journal of Clinical and Health Psychology* and the *Revista Argentina de Clínica Psicológica* stand out. For Zyoud et al., (2018) *Computers in Human Behavior* was the most prolific journal. Regarding the countries of origin of the research, the United States stands out in both databases, followed by China and the United Kingdom, which exchange their positions in the Scopus and WoS databases. This is corroborated by Ho et al.

(2021), whose analyses showed that the United States has produced the largest amount of empirical research on the psychological impact of COVID-19, and most of the research in all countries was clinical and psychopathological. Hernandez-Torrano & Ho (2021), confirms that most studies have been published in English and in the United States, although research produced in China has experienced the greatest growth. For Allik (2013), personality psychologists from the United States published the largest number of articles (4924, 57.9 %). While, for Khan et al. (2020), the results show that the most productive contributors also come from U.S. institutions.

Regarding the most predominant type of scientific documents in the databases analyzed, original scientific articles (245 in WoS and 463 in Scopus), followed by editorials and *reviews*. This result coincides with that of Zyoud et al. (2018), for whom the most common document type was research articles (873; 91.03%). Regarding the network analysis of the titles and *abstracts* of the WoS database, the words *knowledge*, *students*, *performance* and *educational psychology* are observed. While in the Scopus database, the words *educational psychology*, *article*, *human* and *psychology* were observed. For Agudelo et al. (2003), the contents of the papers in the areas of Personality, Evaluation and Psychological Treatment, Health Psychology and "Inter-area" stand out. It is concluded that this is the most comprehensive study reporting global trends in education-related research in the field of psychology. Based on the WoS and Scopus databases, the main characteristics concerning publications, authors, sources, collaboration between authors and countries and network analysis have been extracted through bibliometric techniques from the publications carried out in the last 22 years. The growth of the scientific production motivated by the emergence of the pandemic and the affectation to education that this has generated is corroborated, requiring the support of the psychology.

Being a bibliometric research, caution is recommended in certain aspects of the research, considering that some disciplines, particularly in the humanities and social sciences, depend more on particular formats for academic production, especially books and book chapters. These do not track well in tools such as WoS and Scopus, nor is the breadth and depth of subject matter for Humanities and Social Science journals as broad and deep within these tools. Therefore, academics writing books can have their impact measured by these methods. In addition, a scholar may produce few "units" of scholarly output, yet this small body of work may be fundamental to a particular field and produce tremendous impact on the scholarship of a discipline. Standardized metrics will have difficulty accounting for such situations. However, for the present research we have sought to generate a significant number of selected publications, forming a more than representative sample of international research on educational psychology, considering also that scientific production does not stop, due to the current situation faced by the scientific world in the face of the COVID-19 pandemic. Future research will expand the amount of data through more databases and publications. In addition, to obtain the scientometric indicators using other informatics tools that could be more precise than those used in the present research.

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