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Bibliometric Analysis of Educational Research Disseminated in Spanish Journals Between 1990 and 2002

Análisis bibliométrico de la investigación educativa divulgada en publicaciones periódicas españolas entre 1990-2002

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Abstract

This article displays the data collected from the analysis of 3,118 documents on educational research between the years 1990 and 2002. The analysis was made through the paradigm of sociology of science, with the purpose of observing the social and organizational contexts where this knowledge area takes place, such contexts are explained through the following indicators: productivity rate, authorships and collaboration indexes, magazine titles according to the Bradford S. C. model and institutional affiliation of the authors. On the other hand, the content analysis method is applied with the aim of

observing the levels and subject matters that have been reffered to in the articles. The results are presented in 8 categories and 28 variables.

Key words: Sociology of science, bibliometrics, periodicals.

Resumen

En este artículo se presentan los datos obtenidos de analizar 3118 documentos sobre investigación educativa correspondiente al periodo de 1990 a 2002. El análisis se efectuó mediante el paradigma de la sociología de la ciencia, con el fin de observar los contextos organizativos y sociales donde se desenvuelve este campo de conocimiento, expresados a través de los siguientes indicadores: tasa de productividad, autorías e índices de colaboración, títulos de revistas según el modelo Bradford S. C. y filiación institucional de los autores. Por otra parte, se aplica el método del análisis de contenido con el fin de observar los niveles y materias a que han hecho referencia los artículos analizados. Los resultados se representan a través de 8 categorías y 28 variables.

Palabras clave: Sociología de la ciencia, estudios bibliométricos, publicaciones periódicas.

Introduction

The purpose of this study is to show through bibliometric and content indicators the situation map of educational research. To this end, we have analyzed scientific production in this field. The results of its analysis has been transferred to Spanish periodicals, through which the information has been amply dynamized and disseminated. Documents for the analysis were obtained by consulting the Bibliographic Database ISOC–hereinafter BDB ISOC–, in which is amassed a considerable quantity of information.

As a preamble to the educational investigation, we here provide a summary of the functions of the government agencies that motivated it:

1) The Center of Educational Research and Documentation (CIDE), an organization of educational research which programs, coordinates, evaluates and promotes cooperation with other institutions. Its principal mission is to provide the responsible politicians, administrators, educators, and society in general, with objective information and documental support regarding education. These data can be found at its web site: http://wwwn.mec.es/cide/jsp/plantilla.jsp?id=inv01.

2) The National Institute of Evaluation and Quality of the Educational System (INECSE, http://www.ince.mec.es/). Subsidiary of the General Secretariat of Education of the Ministry of Education and Science. It periodically issues a report on the educational indicators of the state system.

In the same vein, the Consortium of Institutions for Development and Research on Education in Europe (CIDREE), was founded in 1990 with the objective of establishing close work relationships among the European educational systems. It

is set up as a self-managing network of educational organizations that play an important role in the field of curricular development and educational research. (Calderhead, 1997).

The set of data and indicators provided by these agencies are extremely valuable references which allow the observation of trends and specific situations pertaining to the country or countries they analyze.

To these must be added the studies conducted by public research agencies (OPIS) which work together on public projects, as well as other studies undertaken by teaching personnel searching for answers to their own questions, so as to optimize the results of the educational processes of teaching and learning.

I. Methodology

The analysis of the information was accomplished by using bibliometric techniques and analysis of the contents of articles published from 1990 to 2002. The objective was to analyze the information on educational research published in Spanish journals, in order to become acquainted with the most relevant trends which the bibliographic references contribute, as expressed through the following indicators:

- The rhythm of growth of the publications through the years analyzed.
- The authors who have published, and the forms they have adopted, if they have worked alone, or in collaboration. The intention is to discover the leadership and the possible work groups of networks.
- The periodical in which the articles have been disseminated. To carry out this analysis, the Bradford S.C. model was used, to detect the titles of the most specific or productive journals.
- The institutional affiliation of the authors and the institutional cooperation. The institutions which produced the publications were identified, as well as their geographical location.

The content treated by the investigations was analyzed on two levels:

1) Based on the thematic classification assigned in the BDB ISOC (Educational file).

2) By means of the descriptors with which the documents have been indexed, to determine the dominant or preferred currents of study expressed in the scientific literature

1.1 Choice of the sample: BDB ISOC

The information was selected in the BDB ISOC, the multidisciplinary database of the areas of Social Science and Humanities, in which are analyzed more than 2,000 titles of Spanish journals. The choice of documents was made taking into account the structural design of the BDB ISOC; the documentary language employed, with which the information is indexed (*European Thesaurus of Education*); the

documentary *software* with which it is managed, and the theme analyzed. Thus, once the BDB terminology had been observed, it was considered relevant to choose those articles which dealt with the following concepts:

Item 1. Research: educational, pedagogical, in the classroom, participative, regarding the profession, regarding curriculums, or action-type.

Item 2. Years of publications from 1990 to 2002.

Item 3. Thematic classification (educational file) which has typified the following categories referring to educational research: Organization of education, cost, evaluation, theories, methods, comparative education, courses, behavior, research projects, teacher updating.

After interrelating items 1, 2 and 3, the results totaled 3,118 documents.

II. Results

2.1 Years of publication for the documents analyzed

Figure 1 shows the documents published in each of the years covered by the study. There were 3,118 articles in the sample analyzed, which represents a mean of 239,84 documents per year.
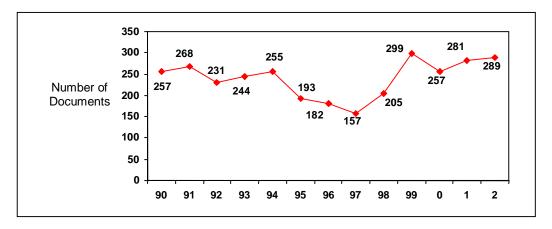

Figure 1. Distribution of articles per year

We can observe that in the first 5 years the trend in the number of publications is similar. There is a noticeable descent in the following 4 years, after which there is a small increase. In reference, Table I shows the number of documents analyzed, the annual BDD totals, and those indexed from the area from which the sample is taken.

Table I. Total documents for the area of education

Years	Analyzed	Total	Indexed
1990	257	18749	1653
1991	268	21443	1391
1992	231	23411	1549
1993	244	24101	1562
1994	255	24438	1620
1995	193	23869	1406
1996	182	23947	1343
1997	157	23207	1280
1998	205	22527	1491
1999	299	23102	1564
2000	257	23113	1260
2001	281	20701	1286
2002	289	19231	1248
∑	3118		

2.2 Titles of journals

To make the analysis of the titles of journals that have published on educational research, the Bradford S.C. model of dispersion of scientific literature was applied. This model permits an identification of the nucleus of more specific journals which have contributed information on the theme *object of study*—better known as the *law of dissemination of scientific literature.* In Table II the journals are arranged in descending order by number of documents published, for nuclei 1 and 2; the year in which their publication began is reflected as complementary data.

Table II. Nucleus 1 and 2 of Bradford S.C.

Titles of Journals	Documents	Year begun
Revista Investigación Educativa (RIE)	308	1983
Revista de Educación (Madrid)	226	1952
Bordón	186	1949
Enseñanza de las Ciencias. Revista de Investigación y Experiencias Didácticas	159	1983
Revista Interuniversitaria de Formación del Profesorado	132	1987
Iber. Didáctica de las Ciencias Sociales, Geografía e Historia	87	1994
Enseñanza. Anuario Interuniversitario de Didáctica	87	1983
Cuadernos de Pedagogía	84	1975
Alambique. Didáctica de las Ciencias Experimentales	80	1994
Revista Española de Pedagogía	69	1943
Revista de Ciencias de la Educación (Madrid)	69	1970
Revista Complutense de Educación	68	1991
Investigación en la E	59	1987
Organización y Gestión Educativa	53	1997
Revista Española de Educación Comparada	46	1995
Aula Abierta	46	1973
Revista de Enseñanza Universitaria	43	1991

Titles of Journals	Documents	Year begun
Tarbiya	40	1992
Educar	38	1982
Campo Abierto	34	1982
XXI. Revista de Educación	33	1999
Tantak	33	1989
Publicaciones de la Escuela Universitaria del Profesorado de Melilla	33	1981

In applying the model of Bradford, S.C. three zones were established: nucleus one, with 1,011 documents, 33.37% of which are published in the first five titles of the journals reflected above; nucleus two, with 1,002 documents, 33.07% of which were published in 18 titles; and finally, nucleus three, with 1,017 documents, 33.56% of which were published in 157 titles. There are 181 titles in the total set, which allows us to deduce that there is a strong concentration of the information, since in other studies of the educational area the dispersion of titles is much higher (Anta, 2004a, 2004b).

2.3 Authorships

The study of this variable permits us to identify the authors with the articles they produced. From this we can deduce which are more productive, and which who are less. This analysis offers the possibility of detecting the leaders or most prolific persons—the unmistakable experts or authorities in the field. In the set of 3,118 documents, 27 are anonymous, and the rest have been written by 5,710 authors; this represents a mean of 1.85 authors per document. Although this is one of the highest means obtained, as compared with other studies of the area, it is still low (Exposito and Fernandez Cano, 2002).

2.4 Index of collaboration

The collaboration of researchers or professionals in writing a work or an article has increased markedly in all areas of knowledge; this has been slower in social science and humanities. Still, one can see that there is an increasing number of documents done in collaboration. Without a doubt, there is greater approval on the part of the scientific community in general, and in particular, for a group or team. Hence, this index, drawn up with the aim of observing the communications networks between specialists in education.

In the evaluation, there were found 1,301 documents written by two or more authors—which elevates the percentage of collaboration to 41.72%. Table III shows the groups of authors obtained. This index is slightly higher than those found for the area in other works (Anta 2004a, 2004b), and is a positive datum, since the study was done by more than one researcher, and as a result, observation of the data can provide more material for discussion.

Table III. Collaboration between authors

Authors	Documents
12	5
11	1
10	5
9	11
8	7
7	7
6	27
5	56
4	154
3	316
2	712
1	1,791

2.5 Institutional affiliation of the authors

The information shown in this section has to do with the institutions where the authors did the work, or had the experience they express in the articles. From this can be deduced the contractual link or relationship—scientific, or of another type— which they have with the organization, and which in some way reflects its objectives or lines of study. There are 2,417 documents (77.51%) in the set which provides information about this. Table IV contains the generic names of the institutions found.

Table IV. Workplaces of the authors

Organizations	Documents	%
University	2,117	67.89
UNED	98	3.14
Institutes	221	7.08
Junior high schools	22	0.71
Schools	107	3.43
Centers	90	2.88
Academies	32	1.02

We found that the university is the institution with the greatest number of publications; however, it is increasingly common for institutes, colleges and schools to make public the information they generate.

2.6 Institutional cooperation

Table V shows the results obtained to quantify institutional collaboration, i.e., the organizations that have participated in the publications. The set of documents produced by researchers from two or more institutions amounted to 294.

Table V. Number of organizations per article

Institutions	Documents
8	1
7	0
6	2
5	5
4	2
3	51
2	233
1	2,123

In order to know the geographical origin of researchers and institutions who have been participants in the works, Table VI was produced. It presents the number of documents published in each of the autonomous communities and their respective cities.

Table VI. Distribution of documents published by autonomous communities

Cities	Documents	Totals
Andalucía		
Sevilla	204	
Granada	162	
Málaga	73	
Huelva	44	
Cádiz	27	Σ 591
Córdoba	26	
Jaén	28	
Almería	27	
Madrid		
Madrid	387	Σ 387
Comunidad Valenciana		
Valencia	179	
Alicante	25	Σ 212
Castellón	8	
Cataluña		
Barcelona	251	
Tarragona		
Lleida	10	Σ 280
Gerona	19	
Galicia		
Santiago de Compostela	92	
Coruña	68	
Vigo	26	Σ 207
Pontevedra	6	
Lugo	4	
Orense	11	
Castilla y León		

Cities	Documents	Totals
Salamanca	76	Σ 140
Valladolid	37	
León	13	
Burgos	2	
Segovia	5	
Ávila	4	
Soria	2	
Zamora	1	
Murcia		
Murcia	81	Σ 81
Illes Balears		
Baleares	32	Σ 32
Principado de Asturias		
Oviedo	68	Σ 68
Aragón		
Zaragoza	23	Σ 26
Huesca	1	
Teruel	2	
Extremadura		
Badajoz	18	Σ 21
Cáceres	3	
País Vasco		
País Vasco	59	Σ 59
Cantabria		
Cantabria	6	Σ 15
Santander	9	
Canarias		
Gran Canaria	1	Σ 52
Tenerife	51	
Navarra		
Pamplona	12	Σ 12
La Rioja		
Rioja	6	Σ 12
Logroño	6	
Castilla-La Mancha		
Toledo	4	Σ 16
Albacete	2	
Guadalajara	6	
Cuenca	4	
Ciudad Real		

There are documents from all the autonomous communities, but these are the most productive: Andalucia, Madrid, Cataluña, Valencia, Castilla and Leon.

2.7 International organizations

The information proceeding from international institutions is reflected in Table VII. Two hundred ninety-six relevant articles were found: 126 from Latin America; 120 from European countries; and 50 from other places.

Table VII. Countries of international organizations

Latin America	Documents
Argentina	37
Mexico	30
Brazil	24
Cuba	10
Chile	8
Venezuela	7
Colombia	3
Costa Rica	3
Uruguay	1
Puerto Rico	1
Guatemala	1
Dominican Republic	1
Europe	**Documents**
United Kingdom	27
France	22
Germany	17
Portugal	17
Italia	9
Sweden	7
Netherlands	3
Australia	3
Holland	2
Belgium	2
Hungary	2
Rumania	2
Russia	1
Austria	1
Iceland	1
Ireland	1
Switzerland	1
Norway	1
Czech Republic	1
Others	**Documents**
United States	37
Canada	10
Nigeria	2
China	1

These data can have more than one interpretation. On the one hand, information can be obtained from other, different geographic contexts, what is being done by specialists in the area can be observed. The mean for articles by international organizations published in Spanish journals is 22.76 documents per year.

2.8 Languages

Obviously, the greater part of the publications were written in Spanish, although there are documents in other languages of the Spanish state, and in languages from other geographical environments (see Table VIII).

Table VIII. Distribution by languages

Languages	Nº	%
Spanish	2953	94.71
Catalan	53	1.70
Galician	42	1.35
Euskera	33	1.06
English	21	0.67
Portuguese	12	0.38
French	4	0.12

2.9 Contents

The study was also geared to determining the contents to which the documents refer. It was based on the thematic area *object of the study*, *educational research,* and related terms, as indicated in the section on the choice of the sample.

On the other hand, by means of indexing methodology, represented by a mean of 6 to 8 descriptors per article, which express the conceptual representation of the information analyzed, there was obtained a wide range of concepts synthesized in a battery of 28 variables grouped in 8 categories.

2.10 Educational levels

High School is the level of education with the most students, followed by Elementary School. Regarding the data on Upper-level Education, it may be that their transference is shown in a more specific form, and that some do not reflect the educational level (see Figure 2).
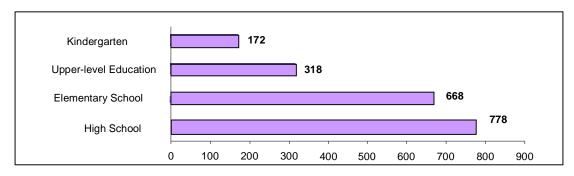

Figure 2. Distribution by educational levels

2.11Teachers

The training and updating of teachers are preferred points of interest in the theme analyzed, as may be observed in Figure 3.
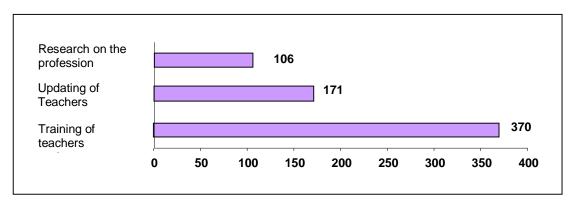
Figure 3. Teaching profession

2.12 Subjects

In order to facilitate the interpretation, subjects were grouped, since all the curriculum areas were an object of study for this work. In this classification, an effort has been made to gather information in two areas: Science; and Social Sciences and Humanities. Also shown are other subjects, which because of the number of results and the importance of the theme, it seemed necessary to stress (see Figure 4).

Figure 4. Areas of education

2.13 Curriculum

The curriculum and research concerning it has been one of the most preferable of the themes analyzed. (see Figure 5).
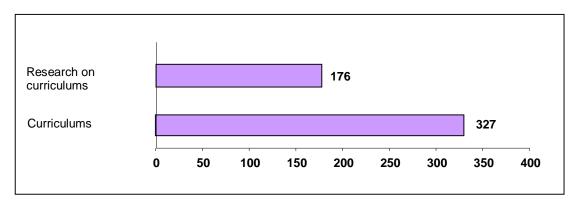

Figure 5. Curriculums

2.14 Psychology of education

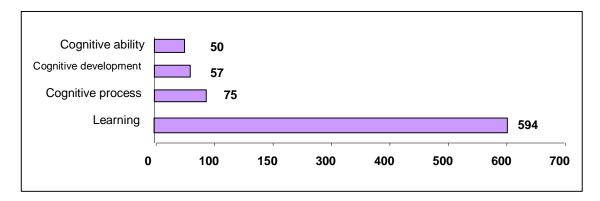Learning, and its various typologies, has been the most important object of many of the studies (see Figure 6).

Figure 6. Psychology of education

2.15 Learning center

Although research on the learning center is analyzed less frequently than other themes, it is nonetheless significant (see Figure 7).
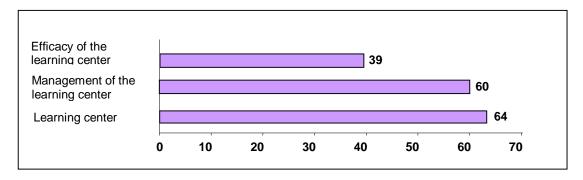

Figure 7. Learning center

2.16 Sociology of education

Cultural pluralism and interculturality are themes which offer data of notable interest today (see Figure 8).
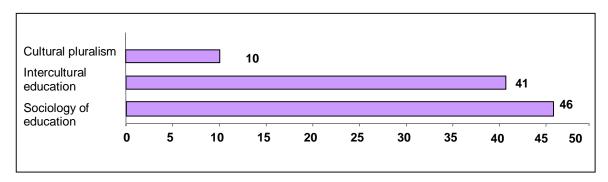

Figure 8. Sociology of education

2.17 Educational technology

Studies on educational technology offer data regarding its use and application in the area, together with its possible implications (see Figure 9).
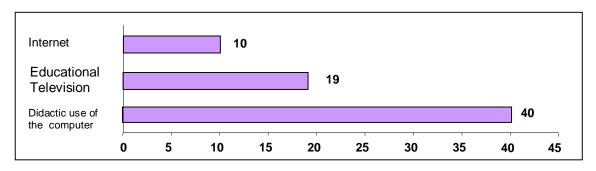

Figure 9. Educational technology

III. Conclusions

Productivity on educational research reaches a mean of 240 documents a year, which is considered acceptable, since data are not known, nor have other studies for comparison been found in the literature. Possibly, this mean could be higher if it included all the information produced on education.

The finding regarding the concentration of the information in a small number of journal titles, offers a profile for specific and preferred journals in which to publish on the area, and in which to find information concerning it. The titles listed in Table II are those for Nuclei 1 and 2 of the Bradford S.C. model, the journals which include a greater number of documents.

The indices of authorship and collaboration provide different data, tending to increase the number of authors per article—those who effect the work in collaboration. In the same vein, it has been possible to observe the authors' institutional affiliation, and to perceive that the popular trend is for authors to publish together, as well as to involve their institutions.

The geographic scope in which the investigations have been conducted covers all the Spanish autonomous communities. It has also been observed that researchers in the area of education maintain working relationships with those in other countries and international institutions, since Table VII reflects the 296 articles that provide information on the area analyzed.

The contents to which the articles make reference were extracted from the field of descriptors, and have been referred to a large number of variables shown through 8 categories and 28 variables. Since the terminological dispersion of descriptors is very broad, the choice was made to synthesize them.

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