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Bibliometric analysis through methodological quality indicators of Spanish education journals indexed in JCR during the three year period 2014-2016

Análisis bibliométrico a través de indicadores de calidad metodológica de las revistas españolas de educación indizadas en JCR durante el trienio 2014-2016

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Abstract

This study presents a bibliometric evaluation using methodological quality indicators of scientific production published during the three-year period from 2014 to 2016 in the seven Spanish journals in the field of education that are indexed in Journal Citation Reports (JCR): Revista de Psicodidáctica, Comunicar, Revista de Educación, Educación XX1, Enseñanza de las Ciencias, Revista Española de Pedagogía and Porta Linguarum. Using a bibliometric/descriptive method, a quantitative analysis is presented of a sample of 479 articles selected through deliberate, non-probabilistic sampling. Overall, the results indicate that the evaluated journals have achieved high levels of fulfilment with respect to the proposed indicators of excellent methodological quality although certain journals were superior to others and although improvable methodological indicators were not ignored. These indicators were primarily related to a lack of specification regarding methodological approach, sampling strategy and quantitative (reliability and validity) as well as qualitative quality criteria. Finally, our empirical results suggest that the better considered a JCR journal is, the more likely it is to be credited with better methodological quality.

Keywords: Bibliometrics, research evaluation, academic journals, research methods, quality control

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Resumen

Este estudio pretende realizar una evaluación bibliométrica a través de indicadores de calidad metodológica de la producción científica publicada durante el trienio de 2014 a 2016 en las siete revistas españolas de educación indexadas en el Journal Citation Reports (JCR): Revista de Psicodidáctica; Comunicar; Revista de Educación; Educación XX1; Enseñanza de las Ciencias; Revista Española de Pedagogía; y Porta Linguarum. A través de una metodología bibliométrica-descriptiva se analiza cuantitativamente una muestra de artículos que asciende a 479 y seleccionados a través de un muestreo no probabilístico de tipo deliberado. Globalmente, los resultados obtenidos apuntan a que las revistas evaluadas han logrado niveles de cumplimiento de los indicadores metodológicos propuestos bastante altos que manifiestan la excelente calidad metodológica que atesoran dichas publicaciones, aunque mejor en unas revistas que en otras y sin menoscabo para que también se hayan detectado indicadores metodológicos mejorables. Dichos indicadores están relacionados, sobre todo, con la no explicitación de las tipologías de abordaje metodológico, del muestreo utilizado, así como de los criterios de calidad cuantitativos (fiabilidad y validez) y de naturaleza cualitativa. Finalmente, destacar que hay evidencias empíricas que apoyan que cuanto mejor considerada es una revista en JCR también es acreedora de una mejor calidad metodológica.

Palabras clave: Bibliometría, investigación de evaluación, revistas académicas, métodos de investigación, control de calidad

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For Delgado López-Cózar, Ruiz-Pérez and Jiménez-Contreras (2006), in nearly all of the sciences, scientific journals are the main instrument of the communication and transfer

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of scientific information. Researchers and professionals in any scientific discipline turn to scientific journals to publicize their research and/or findings or inform themselves regarding new discoveries, among other reasons. In short, scientific journals represent an indispensable means of providing and acquiring information. In addition, journals are a tool for evaluating scientific research (Valenciano, Villamón & Devís-Devís, 2008). Concern among diverse agents regarding the journal quality has increased considerably in recent years, with numerous indices now available to evaluate the prestige of each publication.

Many agents are interested in journal evaluation (Rousseau, 2002). Librarians are interested in these evaluations for selection and deselection purposes and with respect to the relationship between journal impact and price. Scientists are interested in finding the most relevant journal in which to publish their results. Funding bodies and governments wish for their beneficiaries to publish in the most prestigious journals. Editors associate the highest scores on citations with successful editorial practice and policy. In addition, university research councils use journal impact and prestige scores with the aim of increasing the visibility of the research performed at their respective institutions.

The most widely used method for evaluating journals is the impact factor (IF) provided by Journal Citation Reports (JCR) according to citations in articles in journals indexed in the Science Citation Index (SCI) or the Social Sciences Citation Index (SSCI). The IF is one of the most commonly used indicators and based on the number of citations in articles appearing in other articles, with citations being counted during a period of two years previous to the current year. However, the IF factor is not unaffected by certain limitations, as explained by Seglen (1997):

- The impact factor of a journal is not statistically representative of its individual articles.
- Incomplete coverage of the SCI and SSCI databases, with a clear bias in favour of the English language (primarily North American publications) to the detriment of those in other languages.
- Longer articles include a larger number of citations, resulting in high IFs for certain journals.
- In addition to the IF, authors consider other criteria when submitting their manuscripts to a journal.

The importance of search indicators to evaluate the quality, impact and evolution of research has increased in recent years. Evaluation methods (Bellavista et al., 1991) use quantitative indicators of research input and output that can be obtained from internal or external databases. These customizable indicators facilitate comparison when the indicators are related to particularly stable variables and as such feasible for measurement (Pérez Juste, 2005). However, as stated by Torres-Salinas et al. (2010), bibliometric indicators lose efficacy with domestic journals in the area of the social sciences and the humanities because they receive poorer coverage in databases such as JCR. This poorer coverage results in a significant imbalance with respect to the natural sciences, whose research activity can be more successfully portrayed.

Numerous studies performed from many perspectives have addressed the evaluation of scientific journals in the field of educational research and related social sciences in Spain. Recent examples include the studies by Giménez Toledo (2014), Nikleva and Cortina (2014), Flórez Parra, López Pérez and López Hernández (2014), Olivas Ávila and Musi Lechuga (2014), Galindo-Rodríguez and Arginaga (2018), Lorenzo Lledó, Lledó Carreres, Lorenzo Lledó, Arráez Vera and Gómez–Puerta (2018) as well as Schmitt-Nunnes (2019). However, these studies address indicators that have little or nothing to do with the methodological quality indicators of a research report. That is, they typically propose multiple approaches to the evaluation

of scientific journals in which the impact based on the citations received would enable a publication to be considered more or less prestigious within the scientific community. Borrego and Urbano (2006) explain that the tendency to equate article quality with the quality of the journal in which it is published is one of the most frequent problems. One should not make the mistake of considering a single citation indicator (i.e., the IF) and based on that indicator to extend the visibility and quality of a journal to all of the articles published in it.

With the previously mentioned studies representing the general trend, we can highlight certain other studies more closely related to this research. We refer specifically to Bueno and Fernández-Cano (2003), Valenciano et al. (2008), Gómez-García, Ramiro, Ariza and Granados (2012), Ariza and Quevedo Blasco (2015), Rodríguez-Sabiote and Álvarez-Rodríguez (2015), Rodríguez-Sabiote (2017a) as well as Perales-Palacio, Vílchez-González and Gutiérrez-Pérez (2017). All of these studies, although primarily the last two, propose a series of methodological indicators related to what Arnau, Anguera and Gómez (1990) term the technical/methodological and statistical/analytical levels of empirical research reports.

Study objectives

Based on the proposal by Rodríguez-Sabiote (2017b), the primary objective of this study is to conduct a bibliometric evaluation of the scientific research published from 2014 to 2016 in the seven JCR-indexed Spanish education journals indexed according to certain methodological indicators. The journals in question will be described in the section on sampling. With this general objective, the following specific objectives are proposed:

- To identify whether in each of the evaluated journals there is fulfilment or non- fulfilment of the methodological quality indicators;
- To compare the percentages of fulfilment of methodological indicators with normative and criterion-type reference percentages;
- To establish which methodological indicators stand out compared to others that should be improved because of non-fulfilment; and
- To determine whether the place in the hierarchy occupied by the evaluated journals in their JCR ranking is related or not related to the fulfilment of the methodological indicators considered in this study.

Method

Study variables

As study variables, we considered, on one hand, the two identifying variables, i.e., journal name and publication date (for more detailed information, consult the following section regarding the sampling process and sample characteristics) and, on the other hand, analysis variables, i.e., the various methodological indicators proposed by Rodríguez-Sabiote (2017b, p.2) related to each element of the research process (Table 1).

Table 1. Consistency between the elements of the research process and the considered methodological indicators and their operationalization

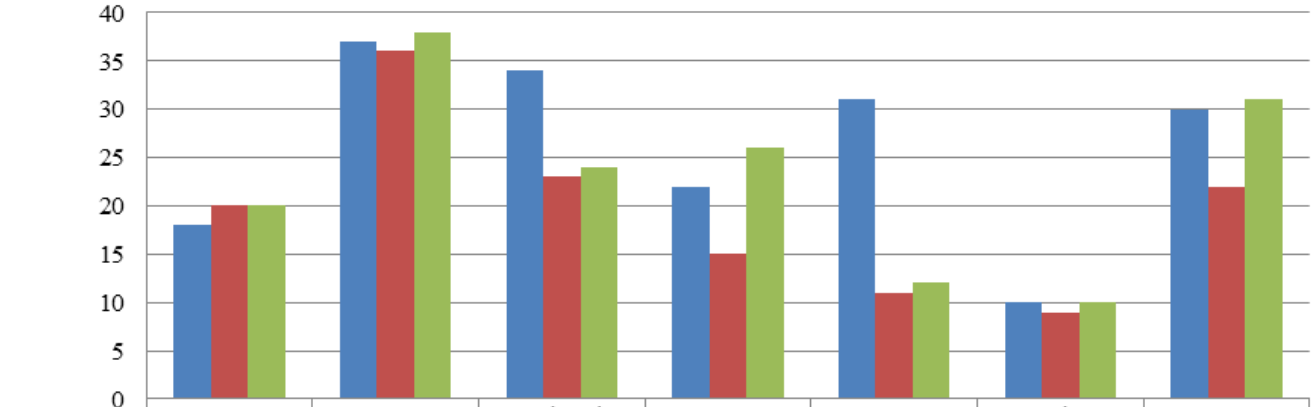
Element of the research process	**Methodological indicator / code**		**Operationalization of the indicator**
Objectives and/or hypothesis	OH1		Specified or not
Methodological approach	ME1		Specified or not
Variables	VA1		Specified or not
Sampling process		Sample size (SA1)	Specified or not
		Sample characteristics (SA2)	Specified or not
		Sample type (quantitative and/or qualitative) (SA3)	Specified or not
Data collection	Data collection instruments (quantitative and/or qualitative) (DT1)		Specified or not
Quality criteria	Quality parameters of a quantitative nature and/or qualitative criteria (QU1)		Specified or not
Analysis and discussion of data		ANA1	The analyses (quantitative and/or qualitative) are or are not congruent with the proposed objectives and/or hypotheses
		AN2	The analyses (quantitative and/or qualitative) are or are not congruent with the proposed objectives and/or hypotheses

Source: Created based on Rodríguez-Sabiote (2017b, p. 2).

Sample

The analysed sample consisted of a 479 articles in seven Spanish scientific journals in the area of education indexed in 2016 (the last year of reference) in Web of Science (WOS) with a JCR IF and published during the three-year period from 2014 to 2016. Logically, another main inclusion criterion was that the study was empirical. Thus, theoretical studies were eliminated (an aspect that had a significant impact on Revista Española de Pedagogía, drastically reducing its sample contribution). In addition, publications that were considered to describe educational experiences (the case of Revista de Enseñanza de las Ciencias) or adopted another format not considered empirical were eliminated.

The number of articles analysed by year and journal are shown below.



	Revista de Psicodidáctica	Comunicar	Revista de Educación (MEC)	Educación XXI	Enseñanza de las Ciencias	Revista Española de Pegagogía	Porta Linguarum
Year 2014	18	37	34	22	31	10	30
Year 2015	20	36	23	15	11	9	22
Year 2016	20	38	24	26	12	10	31

Figure 1. Sampling distribution by journal and year of analysis

Agreement in the process of assigning fulfilment vs. non-fulfilment of methodological indicators

The process of assigning the categories of fulfilment (1) or non-fulfilment (0) to the methodological indicators of each evaluated article in a manner corresponding to the analysed journals was performed by two different researchers. One of them categorized four journals and the other the remaining three. Therefore, to guarantee an acceptable level of objectivity, we calculated the agreement demonstrated by the researchers in relation to two external evaluators with sufficient knowledge of the topic (evaluator 1 and evaluator 2). To this end, we randomly selected seven articles (the first four categorized by main researcher 1 and the remaining three categorized by main researcher 2) from each of the analysed journals, thus implementing so-called inter-rater agreement. For this purpose, we calculated the coefficient most appropriate to the starting conditions, i.e., the nominal nature of the classifications (does fulfil/does not fulfil) and the pertinent comparisons, i.e., the main researchers (considered as a single researcher vs. external evaluators). The selected coefficient was Cohen's kappa.

The results in this regard were as follows. In the first case, i.e., the main researcher vs. evaluator 1, a single agreement of 90% and an expected agreement of 66.65% were obtained. According to the classification by Landis and Koch (1977), the Cohen's kappa value (K = 0.70) represents good agreement. In addition to this classificatory label, we considered the asymptotic standard error obtained ($\sigma\kappa = 0.114$) associated with the Z value (Z = 6.14) and, therefore, statistically significant ($p < 0.05$), i.e., exactly associated with a $p > Z = 0.000$. In short, we verified the rejection of the null hypothesis Ho: $\kappa = 0$ with $Z = \kappa / \sigma\kappa \cong N (0.1)$, and we affirmed that agreement between the main researcher and evaluator 1 was moderate and not random. However, regarding agreement between evaluator 1 vs. evaluator 2, a single agreement of 78.57% and an expected agreement of 60.78% were obtained. Here, Cohen's kappa (K = 0.44) was noticeably lower than in the first case and can be considered moderate agreement, which in any case obtained an asymptotic standard

error ($\sigma\kappa = 0.105$) associated with a Z value ($Z = 4.31$) and thus statistically significant ($p < 0.05$), i.e., exactly associated with $p > Z = 0.000$. In short, agreement was again moderate and not random.

Results

For the analysis and discussion of the data, we used the software programs SPSS v. 25 and STATA v. 14 as well as an Excel spreadsheet for generating graphs. The analyses were strictly descriptive. Our aim was to present this section from two different perspectives: on one hand, referring to the 10 indicators individually and, on the other, as a whole representing the absence vs. presence of fulfilment.

Analysis of the data while examining the indicators individually

Consistent with one of our specific research objectives, we sought to compare the results obtained for each methodological indicator analysed in each journal with different types of cut-off point (normative and criterion).

The first cut-off points reflect the average methodological fulfilment achieved by each indicator individually (10 indicators) and all of the analysed journals (seven journals). As preparation, we calculated the quotient between the sum of the percentages of articles that fulfil the indicator in each journal divided by seven (i.e., the number of analysed journals). This first comparative strategy obeyed a similar logic to that used in the normative evaluation because it took into account the level of fulfilment of the indicators of the seven analysed journals. In this sense, we sought to produce overall average cut-off percentages (taking the arithmetic mean percentage as a border point) for articles that fulfil the indicator. An example is the indicator of objectives and hypothesis (OH1), which was calculated as follows:

$$\frac{\sum_{i=1}^{n} percentages\ of\ presence\ of\ the\ indicator\ in\ each\ journal}{7(number\ of\ journals\ evaluated)}$$

$$\frac{\sum_{i=1}^{n} 98{,}40+87{,}40+90{,}1+100+88{,}90+96{,}60+86{,}70}{7} = 92.07\%$$

Second, we analysed the cut-off point that we considered least conservative (although being below it is greater cause for concern), that is, taking 50% fulfilment as a cut-off point (logic of evaluation criterion). In summary, we used the following cut-off points (Table 2).

Table 2. Cut-off points of the methodological indicators (fulfilment percentages) taking into account different strategies of analysis

Methodological indicators	Normative cut-off points (overall average percentage of presence) for each indicator	Criterion cut-off point percentage
OH1	92.07%	50%
ME1	56.31%	
VA1	79.11%	
SA1	95.53%	
SA2	81.13%	
SA3	46.04%	
DT1	95.24%	
QU1	52.69%	
AN1	87.76%	
AN2	99.03%	

The first noteworthy aspect that appears after calculating this set of average fulfilment percentages, if we leave aside the criterion type (50%), is that the fulfilment percentages of the methodological indicators are highly satisfactory if we exclude the particular cases of type of methodological approach (ME1= 56.31%), sampling type(s) used (SA3=46.04%) and explicit quality criteria (QU1=52.69%). In the three cases, these methodological indicators can be improved although their incidence is not similar in all of the analysed journals.

Second, based on the preceding consideration of the cut-off points, we compared the average fulfilment percentages of the methodological indicators for each journal. To this end, we marked or did not mark each of the percentages of articles that fulfil the indicator in each of the journals with asterisks (one, two or none) depending on whether its percentage was below or above any of the considered cut-off points. In this way, the percentages of articles that fulfil the methodological indicator and are not marked indicate whether optimal results for fulfilment are achieved. In contrast, those articles marked with an asterisk could improve to an extent because one asterisk signifies that they are below the normative cut-off point for fulfilment of each indicator individually, while two asterisks signifies they are below the criterion cut-off point of fulfilment for each indicator (50%). The results in this regard are provided in Table 3.

Table 3. Number and percentage of articles in each evaluated journal that fulfil each methodological indicator

Journals	Methodological indicators	No. of papers that meet the indicator	Percentage of papers that meet the indicator
Revista de Psicodidáctica	OH1	55	94,8%
	ME1	23	39,7%**
	VA1	52	89,7%
	SA1	58	100%
	SA2	58	100%
	SA3	35	60,3%
	DT1	58	100%
	QU1	52	89,7%
	AN1	55	94,8%
	AN2	58	100%
	Number of papers evaluated in the journal	58	
Comunicar	OH1	97	87,4%
	ME1	66	59,5%
	VA1	68	61,3%*
	SA1	103	92,8%
	SA2	95	85,6%
	SA3	46	41,4%**
	DT1	98	88,3%*
	QU1	52	46,8%**
	AN1	97	87,4%*
	AN2	111	100,0%
	Number of papers evaluated in the journal	111	
Revista de Educación (MEC)	OH1	73	90,1%
	ME1	42	51,9%*
	VA1	54	66,7%*
	SA1	69	85,2%
	SA2	59	72,8%*
	SA3	30	37%**
	DT1	68	84,0%
	QU1	33	40,7%**
	AN1	73	90,1%
	AN2	81	100%
	Number of papers evaluated in the journal	81	
Educación XX1	OH1	63	100%
	ME1	47	74,60%
	VA1	63	100%
	SA1	61	96,80%
	SA2	52	82,50%
	SA3	38	60,30%
	DT1	62	98,40%
	QU1	40	63,50%
	AN1	57	90,50%

Journals	Methodological indicators	No. of papers that meet the indicator	Percentage of papers that meet the indicator
	AN2	60	95,20%
	Number of papers evaluated in the journal	63	
Enseñanza de las Ciencias	OH1	48	88,9%*
	ME1	18	33,3%**
	VA1	41	75,9%*
	SA1	52	96,3%
	SA2	26	48,1%**
	SA3	15	27,8%**
	DT1	54	100%
	QU1	5	9,3%**
	AN1	35	64,8%*
	AN2	54	100%
	Number of papers evaluated in the journal	54	
Revista Española de Pedagogía	OH1	28	96,6%
	ME1	28	96,6%
	VA1	29	100%
	SA1	29	100%
	SA2	26	89,7%
	SA3	20	69%
	DT1	29	100%
	QU1	17	58,6%
	AN1	29	100%
	AN2	28	96,6%
	Number of papers evaluated in the journal	29	
Porta Linguarum	OH1	72	86,7%*
	ME1	32	38,6%**
	VA1	50	60,2%*
	SA1	81	97,6%
	SA2	74	89,2%
	SA3	22	26,5%**
	DT1	81	97,6%
	QU1	50	60,2%*
	AN1	72	86,7%*
	AN2	83	100%
	Number of papers evaluated in the journal	83	

Note. *Percentage of articles below the normative cut-off point for fulfilment of each indicator.

**Percentage of articles below the overall criterion cut-off point for fulfilment of each indicator (50%).

An initial inspection of Table 3 confirms the presence of methodological indicators that demonstrate certain weakness, although with more intensity in certain journals than others. For this reason and to avoid a cumbersome report full of figures and comments on them, we present a summary table that synthesizes the results obtained for each analysed journals with the proposed methodological indicators for fulfilment.

Table 4. Number of optimal, improvable and very improvable indicators by journal

Journal	No. of optimal indictors	No. of indicators that are improvable < % average fulfilment for each indicator	No. of indicators that are very improvable < 50% fulfilment
Revista de Psicodidáctica	9 out of 10 (all except ME1)	-	1 out of 10 (ME1)
Comunicar	5 out of 10 (OH1, ME1, SA1, SA2 and AN2)	3 out of 10 (VA1, DT1 and AN1)	2 out of 10 (SA3 and QU1)
Revista de Educación (MEC)	5 out of 10 (OH1, SA1, DT1, AN1 and AN2	3 out of 10 (ME1, VAR1 and SA2)	2 out of (SA3 and QU1)
Educación XX1	10 out of 10 (all)	-	-
Enseñanza de las Ciencias	3 out of 10 (SA1, DT1 and AN2)	3 out of 10 (OH1, VAR1 and AN1)	4 out of 10 (ME1, SA2, SA3 and QU1)
Revista Española de Pedagogía	10 out of 10 (all)	-	-
Porta Linguarum	4 out of 10 (SA1, SA2, DT1 and AN2	4 out of 10 (OH1, VA1, QU1 and AN1)	2 out of 10 (ME1 and SA3)
TOTAL	**46**	**13**	**11**

Generally, we observe that of the 70 possible indicators (10 methodological indicators repeated in seven journals), 46 indicators were optimal, 13 improvable, and 11 very improvable. We must recall that the methodological indicators that achieved optimal results are those with fulfilment percentages greater than the averages achieved by the methodological indicators and that serve as normative cut-off points. That is, they are those methodological indicators that when examined by journal achieved fulfilment percentages that are above the average among their peers. In this regard, we must highlight the excellent results obtained by the journals Educación XX1 and Revista Española de Pedagogía, with all methodological indicators being optimal (10 out of 10 possible ones) and free from indicators that are improvable or very improvable. No less favourable are the results obtained by Revista de Psicodidáctica, with nine optimal methodological indicators and one that is very improvable in the specific case of methodological approach.

In contrast, the remaining evaluated journals exhibited fewer optimal methodological indicators and thus a larger number of improvable and very improvable indicators. The cases of the journals Comunicar and Revista de Educación (MEC) are identical, with both having five optimal methodological indicators, three improvable (below the average fulfilment percentages among their peers), and two very improvable (below 50% fulfilment). Additionally, the journal Porta Linguarum exhibited results highly similar to those of the previous two journals: four optimal methodological indicators, four improvable, and two very improvable.

In any case, we must bear in mind that the methodological indicators that are improvable are those with fulfilment percentages that are lower than the average percentage for these indicators when considering all of the journals. In addition, those averages were high and therefore rigorous (except in the case of the methodological indicators that refer to types of methodological approach, sampling, and quality criteria). For this reason, we can downplay the fact that these journals exhibited methodological indicators that are improvable given that the comparative values of the normative cut-off points were very

high, although again not in the case of sampling types and quality criteria.

However, we cannot hide our concern regarding the presence of two very improvable methodological indicators in the three previously noted journals given that they display fulfilment levels of under 50%. These indicators refer to a lack of specification of the sampling type(s) used (MU3) and the quality criteria, that is, reliability, the validity of the information-gathering instruments and qualitative quality criteria (CA1) in the cases of Comunicar and Revista de Educación (MEC) and the lack of specification of sample sizes and sampling type(s) in the case of Porta Linguarum.

A separate discussion is required for the specific case of Enseñanza de las Ciencias, which exhibited three optimal methodological indicators (referring to the specification of sample size, information-gathering technique(s) and adequate interpretation of the analysis of quantitative and qualitative data), three improvable indicators (those related to specification of research objectives and/or hypothesis, the study variables and adequate consistency between the research objectives and/or hypothesis and the implemented analyses) and four very improvable indicators (lack of specification of sample size, sample characteristics, type(s) of sample(s) and quantitative or qualitative quality criteria). The results obtained for this journal are justifiable to a certain extent if we consider the following factors:

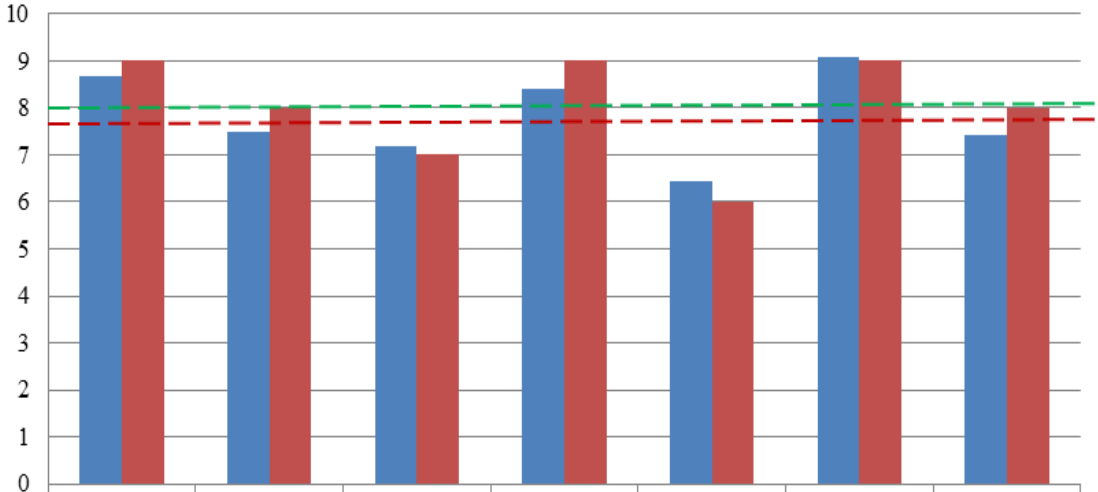
a) Its didactic vocation as a means to disseminate teaching experiences in the teaching and learning of the sciences although only empirical studies were evaluated in this research;

b) Its affiliation with a centre for activities different from those of educational research; and

c) Likely lack of knowledge of the methodological terminology used in educational research on the part of the author(s) typically published in the journal (i.e., teachers at various education levels).

Analysis of the data examining the indicators overall

A second approach to assessing the methodological impact of Spanish journals in the area of education research indexed in WOS with a JCR IF in 2016 (the final year of reference) is to adopt an overall view of the results obtained for each of the analysed articles. In this way, we proceeded to calculate an overall score for each article while considering the sum of fulfilment (1) or non-fulfilment (0) by each regarding the 10 analysed methodological indicators. Based on these summations, we calculated the basic descriptive statistics of the central tendency of mean and median obtained by each journal in relation to the total score.



	Revista de Psicodidáctica	Comunicar	Revista de Educación (MEC)	Educación XXI	Enseñanza de las Ciencias	Revista Española de Pegagogía	Porta Linguarum
Mean	8,69	7,5	7,19	8,41	6,44	9,07	7,43
Median	9	8	7	9	6	9	8

Figure 2. Means and medians obtained for each journal regarding the overall level of fulfilment of the analysed methodological indicators

It can be observed that overall the results obtained for the central tendency values are moderately high. Thus, we recorded a total arithmetic mean of ($\overline{X}$ = 7.67; marked with a dotted red line) and a total median (Me = 8; marked with a dotted green line). If we consider that the maximum score is 10, we can state that on the whole, Spanish journals in the area of education indexed in WOS with a JCR IF in 2016 (final year of reference) during the three-year period of 2014-2016 obtained very good results, with fulfilment of methodological indicators equal to or near 80% based on the mean or median of the distribution. We prefer the second statistic given its robustness in situations of disorder (i.e., rough, with the presence of extreme values or outliers) present in certain of the analysed distributions.

Regarding the results, now disaggregated by journal, we can state that they are generally quite good, with median and mean values of (Me = 9/$\overline{X}$ = 8.69) for Revista de Psicodidáctica, (Me = 9/$\overline{X}$ = 8.41) for Educación XX1, (Me = 9/$\overline{X}$ = 9.07) for Revista Española de Pedagogía, (Me = 8/$\overline{X}$ = 7.5) for Revista Comunicar, (Me = 8/$\overline{X}$ = 7.43) for Porta Linguarum (Me = 7/$\overline{X}$ = 7.19) for Revista de Educación (ME) and (Me = 6/$\overline{X}$ = 6.44) for Enseñanza de las Ciencias. If we consider the possible classification of methodological excellence of articles published in scientific journals proposed by Rodríguez-Sabiote (2017b, pp. 2-3), we can state that Educación XX1, Revista de Psicodidáctica, Revista Española de Pedagogía, Comunicar and Porta Linguarum can be considered journals of high methodological quality (1st quartile with medians and means > 7.50), while Revista de Educación (MEC) and Enseñanza de las Ciencias can be considered journals with moderate methodological quality (medians and means between 5.01 and 7.5).

At this stage, it seemed pertinent and consistent with our ultimate research objective to determine if the JCR ranking of the analysed journals is related or not related to the fulfilment of the methodological indicators analysed in this study. To this end, we first calculated the hierarchical rankings of each journal in the JCR by WOS and in the fulfilment of the analysed methodological indicators.

Table 5. Hierarchical rankings of JCR journals by WOS and in the fulfilment of methodological indicators

Journal	Ranking in JCR by WOS	Ranking in fulfilment of methodological indicators
Revista de Psicodidáctica	1º	2º
Comunicar	2º	4º
Revista de Educación (MEC)	3º	5º
Educación XX1	4º	3º
Enseñanza de las Ciencias	5º	7º
Revista Española de Pedagogía	6º	1º
Porta Linguarum	7º	6º

Second, we calculated Spearman's rho coefficient (ordinal by ordinal and for reduced samples) to evaluate the correlation that can be established between the two hierarchical rankings. In the following table, we present two different situations (Table 6). In the first, we correlated the rankings while taking all of the journals into account. However, because the case of Revista Española de Pedagogía is extreme (6^{th} vs. 1^{st}), we also recalculated the Spearman's rho coefficient while suppressing that case. The results are provided in Table 6.

Table 6. Results of the Spearman's rho correlation between the JCR rankings and rankings on fulfilment of methodological indicators with 7 or 6 journals (i.e., suppressing Revista Española de Pedagogía)

Correlating the rankings of seven journals			**JCR ranking in WOS**	**Ranking in fulfilment of methodological indicators**
Spearman's rho	**JCR ranking in WOS**	Correlation coefficient	1	
		Sig. (bilateral)	.	
		N	7	
	Ranking in fulfilment of methodological indicators	Correlation coefficient	0.286	1
		Sig. (bilateral)	0.535	.
		N	7	7
Correlating the rankings of 6 journals (supressing the extreme case of Revista Española de Pedagogía)			**JCR ranking in WOS**	**Ranking in fulfilment of methodological indicators**
Spearman's rho	**JCR ranking in WOS**	Correlation coefficient	1	
		Sig. (bilateral)	.	
		N	6	
	Ranking in fulfilment of methodological indicators	Correlation coefficient	0.771	1
		Sig. (bilateral)	0.072	.
		N	6	6

Notes. *Statistically significant correlation at 5%.
**Statistically significant correlation at 1%.
*** Statistically significant correlation at 1‰.

As can be observed in the two cases, positive correlations were obtained although of highly different magnitudes (substantially more important when Revista Española de Pedagogía was suppressed) but not statistically significant in either of the two proposed cases. In this regard, the positive sign of both correlations should be interpreted to indicate a directly proportional correlation. That is, when the journals receive high JCR rankings in WOS, they also obtain high rankings for fulfilment of methodological indicators. Regarding the magnitude, it can be observed that in the first case a rho correlation of 0.286 was obtained, which was low and not statistically significant ($p = 0.535$). However, in the second case, a rho correlation of 0.771 was obtained, which was moderately high although also not statistically significant ($p = 0.072$).

Nevertheless, in this specific case, there is sufficient empirical evidence to state that there is high covariation between the JCR classification by WOS and fulfilment of methodological indicators. That is, if a journal is considered better according to JCR, it is also credited with better methodological quality, with the exception of Revista Española de Pedagogía, which obtained high consideration in methodological quality but ranked the worst in the JCR by WOS.

Discussion and conclusions[1]

Whether scientific journals continue to increase their methodological quality will depend directly on the authors of articles, who must take care to clearly explain each of the elements of the research process embodied in the methodological indicators used in this study. All of the methodological aspects of a research paper should be described in a manner that enables others to replicate the paper's findings. In addition, in the process of refereeing submissions, the reviewers at each journal should evaluate as part of their review the specification or lack of specification of these quality variables together with the theoretical content of the article under review.

An additional question is whether a reviewer should determine the quality of the specified methodological indicators and not simply verify their presence or absence. This consideration would have as an immediate consequence the need for a team of reviewers highly trained in various types of methodological and data analysis as well as other experts in the theoretical topic under consideration. It is a fact that in certain disciplines and at certain high-impact journals reviewers receive financial remuneration and in return have obligations regarding specialization and deadlines for their reviews. Many suspect that journals in education "get by" as they can and confront financial hardships regarding funding as well as constant delays in evaluations by reviewers struggling to balance their professional and personal lives with their dedication as reviewers. As noted by Delgado López-Cózar (2015), the creation and maintenance of scientific journals in the field of education has frequently been an arduous task in which success occasionally requires a near miracle.

In this context of precariousness, with Aliaga, Gutiérrez-Braojos and Fernández-Cano (2018, p. 567), we wish to highlight two fundamental weaknesses: 1) scarce initial training for journal managers and 2) the strong dependency of editorial ventures on a specific person whose loss for any reason threatens the publication's survival.

[1] In this final section, the masculine is used. However, this usage includes all women who exercise their functions as editors, journal directors and research article authors with great skill, effort and dedication.

Nevertheless, we strongly recommend a general effort by editors, directors and those in charge of journals to include in their evaluation teams experts in diverse theoretical topics and methodological and data analysis as well as professionals committed to reasonable deadlines who do not unreasonably protract the review process. In this regard, allow us to quote Don Marquis who—despite the differences—stated: "*writing a book of poetry is like dropping a rose petal down the Grand Canyon and waiting for the echo*". The review process should not become a similarly interminable event in which the echo of the review never reaches the author.

Regarding the findings and conclusions of this article, we note first of all that overall the results obtained for the evaluated journals invite optimism. Generally, the journals demonstrate good methodological quality with high percentages of fulfilment of the proposed methodological indicators. It is true that not all of the indicators and not all of the journals obtained the same levels of methodological excellence. Certain methodological indicators were detected whose performance was manifestly improvable. We are referring to the indicators of methodological approach but also in particular the lack of specification of sampling type and of quantitative (reliability and validity) and qualitative quality criteria. This finding fully accords with prior studies by Rodríguez-Sabiote and Álvarez-Rodríguez (2015) and Rodríguez-Sabiote (2017a, 2017b), which detected similar weaknesses in evaluating other journals in the area of education. The improvement of these inadequacies is of vital importance because they correspond to two seminal methodological issues. On one hand, the justification of sample type facilitates the generalization of results based on vertical logic (*sample to population*) or its impossibility (*case to case*) based on horizontal logic. On the other hand, the lack of specification of the reliability and validity criteria of data-collection instruments based on a psychometric theory makes it impossible to guarantee that those instrument measure what they should measure and that they do so with sufficient guarantees of cohesion and consistency. In the qualitative arena, lack of specification of quality criteria based on any approach is a weakness that undermines the credibility, transferability and possibility of replication of studies and the guarantee that the results are not affected by researcher bias (Guba & Lincoln, 2012).

On the other hand, the levels of methodological excellence are dissimilar among the analysed journals. We find that the journals Educación XX1, Revista Española de Pedagogía, and Revista de Psicodidáctica achieved the highest levels of methodological excellence—without intending to criticize the remaining journals, which also achieved notable levels of fulfilment of the evaluated methodological indicators.

Finally, another significant finding was the confirmation that the classification of scientific journals using quality standards based on citations (the currently dominant approach) can be compatible with that of methodological quality indicators. In our case, we can endorse the complementary legitimacy of the approaches and conclude that the better considered a journal is in JCR, the more likely it is to also be credited with better methodological quality.

To conclude, in accordance with Rodríguez-Sabiote (2018), we acknowledge the controversy that this study could entail and encourage prudence and moderation when using its results. In this sense, we request the understanding of editors and directors

although we are convinced that the proper use of the results represents an excellent strategy for improvement.

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