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Review of Google scholar, Web of Science, and Scopus search results: The case of inclusive education research

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Abstract

This study presents a bibliometric analysis of research on inclusive education focusing on the development, scholarly publishing, and various influences on the body of knowledge (information sources, authors, institutions, and countries). Data for this study were collected from three reference and citation-enhanced indexing databases, i.e., Google Scholar, Scopus, and Web of Science. There was diversity in terms of variations of results from one database to the other. This research will be valuable for academia and researchers alike in the field of inclusive education. The researchers in scholarly communication research area, policy makers, and those involved in measuring researchers' performance for promotions and awards on the basis of publications and citations indicators may also benefit.

Key words

Inclusive education; Scholarly communication; Citation analysis; Bibliometrics

Introduction

Bibliometric studies show that there is a high increase in scientific publishing. No research indicators in the last half century illustrated a decline in the scientific publishing. Many new publishing channels in different forms are being introduced in addition to the traditional publishing in books and peer review journals (Larsen & von Ins, 2010). Publication of research results for dissemination of scientific knowledge is a common scholarly practice. Reference and citation-enhanced databases; Google scholar, Web of Science, and Scopus, provide scientometric indicators to help researchers to find their relevant as well as useful information and its resources. These scientometric indicators on citation databases are being used as performance, quality, and achievement measures of researchers by university administrations for promotions and rewards. It is a problematic situation and of serious concern to researchers' community (Nelhans, 2014).

Previous studies have addressed various aspects of these citation databases. Many researchers generally compared these reference databases with each other (Bergman, 2012).

Franceschet (2010) presented a bibliometric coverage of computer sciences in the databases. Yang and Meho (2006) compared the content coverage and available features for faculty ranking in a social sciences discipline, i.e., library and information science. Citation counts and citing sources for specific information source (e.g. book) have also been discussed in scholarly literature (Bar-Ilan, 2010). In the same way, some researchers used these databases in discussions related to research evaluation (Tahira, Alias, & Bakri, 2012). Further, some researchers used these citation data for their bibliometric studies, citation analysis, and research visualization presentations (Jarneving, 2006). However, no study could be found that compared various influences within the research area on the basis of citation counts on these reference and citation-enhanced databases like Google scholar, Web of Science, and Scopus. This study is an attempt to fill this research gap.

Inclusive education research area was selected as a particular case in this research. Although the concept of inclusive education is comparative new but it has produced a body of knowledge in a reasonable size. On the other hand, this area has been neglected in bibliometric studies. The present research has evaluated the coverage of inclusive education research in Google Scholar, Web of Science, and Scopus. The findings have illustrated various influences and aspects of the development of the literature of inclusive education. Potential beneficiaries of this study are academia and researchers working in the area of inclusive education for identification of main authors, information sources, and their influences in the research area. It is of practical use for award, promotion, and funding bodies that consider bibliometric indicators of these databases as valuable measures for researchers' evaluation. Further, this study may stimulate further research in the areas of scientometrics and bibliometrics for proper use of researchers' productivity measures, quality evaluation, and better handling of research awards or rewards.

Literature review

Many studies presented comparison and contrast of different features in citation-enhanced databases, i.e., Google Scholar, Web of Science, and Scopus. Bergman (2012), Falagas et al. (2008), Jasco (2005) and Li et al. (2010) compared content coverage and practical utility of these databases. They concluded that these citation indices differ from one another in one way or the other. Bar-Ilan (2010) stepped forward in concluding that Google Scholar lacked about one third of total citing sources for single book as compared to sum of citing source counts from both Scopus and Web of Science.

Scholarly productivity, publishing, and citation patterns in disciplines under sciences, social sciences, and humanities have great differences (Nederhof, 2006). It has direct effect on the output of search results on these reference extended databases. In pure and applied sciences, Falagas et al. (2008) stated that Google Scholar has often considerably less citations as compared to Web of Science and Scopus. Bakkalbasi et al. (2006) concluded that no single citation index satisfies all citation needs in oncology and condensed matter physics. Franceschet (2010) stated that citation based ranking for both authors and journals do not change in computer sciences.

In social sciences disciplines, Meho and Yang (2007) and Yang and Meho (2006) were convinced that inclusion of Google Scholar citation data into Web of Science and Scopus results provided more accurate and comprehensive scenario of authors' impact in ranking of library and information science faculty. Mingers and Lipitakis (2010) found that Web of Science had poor coverage for business and economics disciplines while Google Scholar had comparatively better coverage for these disciplines. Bergman (2012) conducted a research for social work discipline and came up with results that Web of Science was not a better covering source for that discipline.

Bibliometric indicators for ranking of scholarly published sources like specific books, journals, or universities have dissimilar results on these citation databases. Levine-Clark and Gil (2008) compared citation counts for business and economics journals. They concluded that collective use of alternate tools give better results instead of using any from citation tool. Bar-Ilan (2010) counted citing sources for a single book on these three indices and remarked that almost one third citing sources were not included in citing sources searched through Google Scholar. Aguillo (2011), in a webometric analysis of universities, found that universities in countries like China, Brazil, Spain, Taiwan and Indonesia were of far higher ranking due to non inclusion of low ranking scholarly journals in Web of Science and Scopus. Aguillo had quality concerns in considering Google Scholar as a good bibliometric tool. We can summarize the findings of previous studies by concluding that these reference-extended databases are not a good source for ranking information sources and institutions in social sciences.

Research questions

On the basis of literature review and a consideration of various aspects of these databases (Google Scholar, Scopus and Web of Science) following research questions were designed for this study:

1. What is the development situation in the inclusive education research?
2. What is the publication pattern in the inclusive education research?
3. What is the influence position in the inclusive education research?

Research design and procedure

Research data for this bibliometric study were collected from three citation databases (Web of Science, Scopus and Google Scholar). Keywords used in the search strategy include “inclusive education,” “inclusive learning,” “Inclusion (Education)” and “inclusive schools.” The Web of Science Core Collection (Indexes: SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH.) provided 1,296 results including articles (930), proceedings papers (191), book reviews (73), reviews (34), and book chapters (1). Other document categories of meeting abstract (43), editorial material (33), letter (1), correction (1), correction addition (1), and biographical item (1) were excluded. Thus, there was a sum of 1,216 results for further analysis. Similarly, Scopus provided 2,278 results including articles (1,679), reviews (222), conference papers (154), Book chapters (112), and book (46). Document results reduced to a sum of 2,213 for onward analysis. Google scholar had 15,400 search hits during 1990 to 2014 excluding patents and citations. Google scholar year wise results were downloaded by using Publish or Perish (2007) software. Finally, data for all years were combined on single Excel worksheet. Data duplications were checked and results with corrupted download were deleted. Finally, data sets and results from WoS and Scopus were included as per descriptions by official websites while Google scholar data set and results were compiled and interpreted after necessary calculations using Microsoft Excel.

Results

A summary of the Web of Science results is given in Table 1. Descriptions in Figure 1 were about total productivity and in Figure 2 details were about citations in each year in the research area of inclusive education. It was clear that research productivity was declining. On the other side there was increasing trend towards citations. Citation data for the year 2015 was of continuing year. Year 2015 was delimited from the analysis of the literature growth because it was not finished yet.

Table 1. Bibliometric indicators regarding inclusive education research in Web of Science

Indicators	Statistics
Results found	1216
Sum of the time cited	5318
Sum of times cited without self-citation	3936
Citing articles	3514
Citing articles without self-citations	2994
Average citations per item	4.37
h-index	30

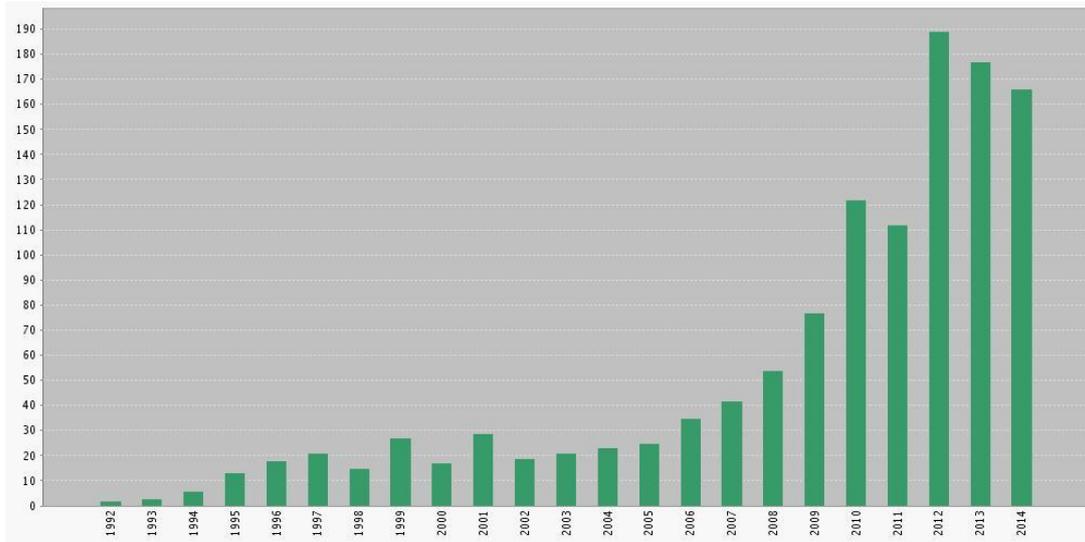


Figure 1. Published items in each year (all years) on inclusive education research in WoS

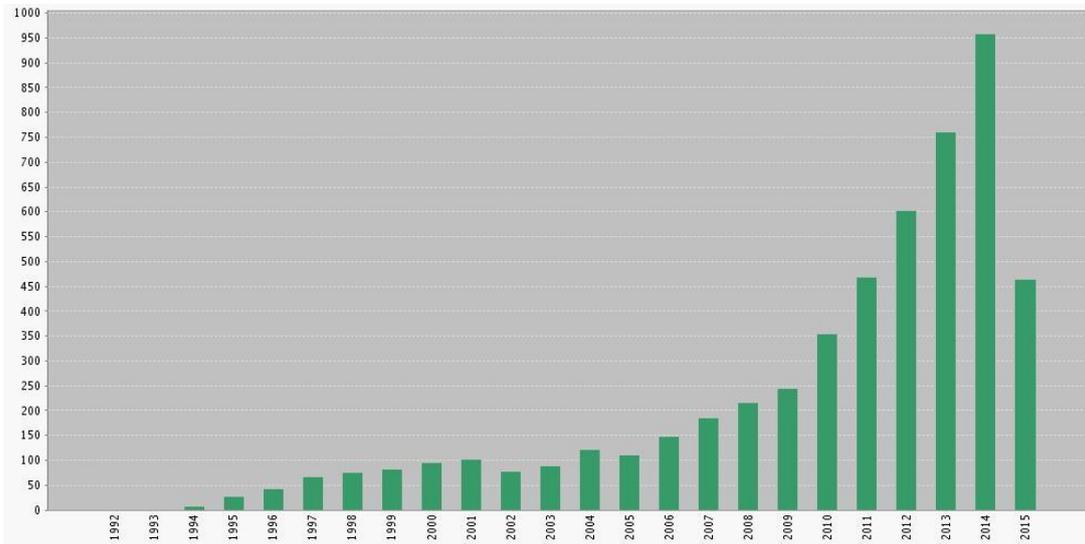


Figure 2. Citations in each year (all years) on inclusive education research in WoS

Figure 3 showed per year citations as per Scopus results. Like WoS, the Scopus results also presented continuous increase in citations with the passage of time. Citation details made it clear that influence of inclusive education research was in phases of continuous development.

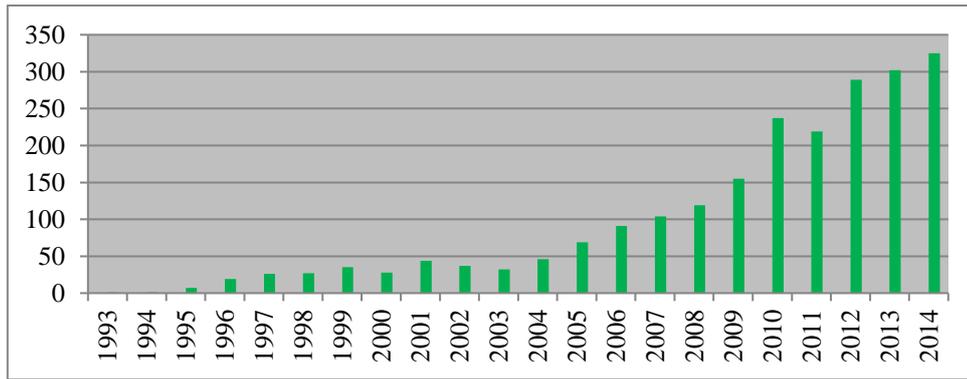


Figure 3. Citations per year as provided by Scopus data

Per year citations details of Google scholar results were shown in Figure 4. Contrary to WoS and Scopus search results, Google scholar did not present any developmental sequence during last decade. Further, it became clear from declining citation trend that this research area had faced its continuous decline of influence in research and scholarly literature. It was also observed that the first decade of twenty first century was the best period for citations or influence of inclusive education research.

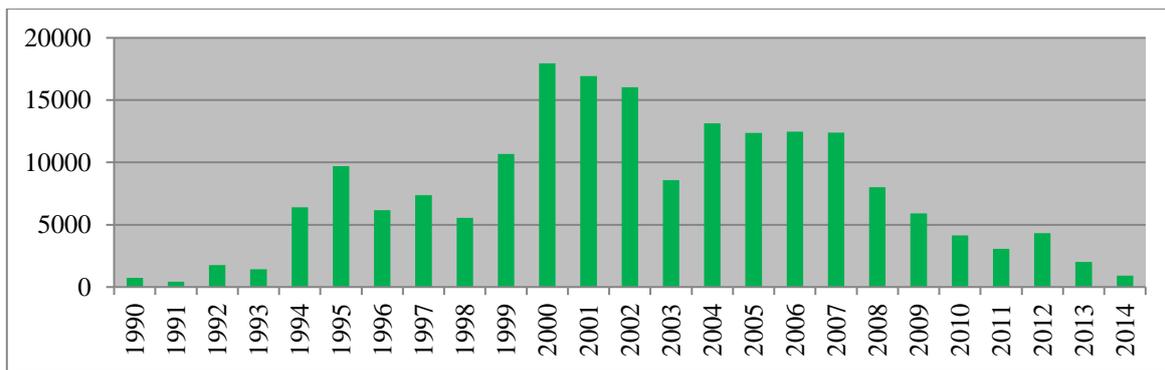


Figure 4. Citations in each year (all years) on inclusive education research by Google Scholar

Tables 2 and table 3 present an overview of inclusive education publications in two databases, i.e., Web of Science (WoS) and Scopus. There was a continuous decline in publications during recent years in WoS while Scopus results presented inclusive education as a progressive research area in terms of yearly publications. Six of top 10 journals were published from UK followed by USA (three journals in WoS). Similarly, key authors who wrote and published their research had different appearances in WoS and Scopus. This change in sequence was due to issues like comparatively less coverage of social sciences research publications in WoS and comparatively more coverage of social sciences and their related subject areas in Scopus. The results on contributing organizations show that USA was leading with four universities followed by UK with three universities in WoS. Conversely, in Scopus, UK was leading with four universities followed by Australia with two universities. Although inclusive education research was led by countries like USA and UK yet there was considerable contribution of small countries like Hong Kong, Norway, and Sweden. Like well-established and penetrated research areas, inclusive education research was mingled with different subject areas.

Table 2. Top 10 inclusive education search results for various categories retrieved from Web of Science.

Rank	Year (Doc.)	Source/Journal (Documents) (Country*)	Author (Doc.)	Organization (Documents)	Country (Doc.)	Subject (Documents)
1	2012 (189)	International Journal of Inclusive Education (211) (UK)	Pijl, S. J. (16)	Hong Kong Instt.of Edu.(22)	USA (291)	Education Edu. Research (891)
2	2013 (179)	Disability Society (57) (UK)	Forlin, C. (15)	Univ. Birmingham (18)	UK (203)	Rehabilitation (239)
3	2014 (167)	Procedia Social and Behavioral Sciences (51) (UK)	Engelbrecht, P. (10)	Univ. Groningen (18)	Australia (114)	Psychology (98)
4	2010 (122)	European Journal of Special Needs Education (30) (UK)	Sharma, U. (10)	Univ. Manchester (18)	Spain (75)	Social Sc. Other Topics (85)
5	2011 (112)	Revista De Educacion (30) (Spain)	Florian, L. (8)	Monash University (16)	S. Africa (65)	Computer Science (50)
6	2009 (77)	Teaching and Teacher Education (28) (UK)	Kozleski, E. B. (8)	Univ. Illinois (16)	Canada (49)	Sociology (23)
7	2008 (54)	Remedial and Special Education (24) (USA)	Miles, S. (8)	Syracuse University (15)	China (45)	Engineering (19)
8	2007 (42)	International Journal of Disability Development and Education (23) (UK)	Minnaert, A. (7)	Columbia University (14)	Norway (36)	Psychiatry (16)
9	2006 (35)	Journal of the Asso. for Persons with Severe Handicaps (18) (USA)	Naraian, S. (7)	Univ. Edinburgh (13)	Netherla. (33)	Business Economics (12)
10	2001 (29)	Res. and Pract. for Persons with Severe Disabilities (16) (USA)	Slee, R. (7)	Univ. Kansas (13)	Scotland (28)	Pub.Env. Occ. Health (10)

Table 3. Top 10 inclusive education search results for various categories retrieved from Scopus.

Rank	Year (Doc.)	Source/Journal (Documents) (Country*)	Author (Doc.)	Organization (Documents)	Country (Doc.)	Subject (Documents)
1	2014 (325)	International Journal of Inclusive Education (267) (UK)	Forlin, C. (28)	Monash University (43)	USA (429)	Social Sciences (1758)
2	2013 (302)	European Journal of Special Needs Education (88) (UK)	Sharma, U. (25)	Univ. Manchester (41)	UK (407)	Psychology (368)
3	2012 (289)	International Journal of Special Education (61) (Canada)	Pijl, S. J. (19)	Hong Kong Instt. of Edu. (37)	Australia (203)	Medicine (341)
4	2011 (219)	Journal of Research in Special Educational Needs (46) (UK)	Loreman T. (18)	University of London (31)	Spain (120)	Arts and Humanities (246)
5	2010 (237)	Revista Brasileira De Educacao Especial (40) (Brazil)	Slee, R. (15)	Queensland Uni. Of Technology (24)	Brazil (113)	Health Professions (238)
6	2009 (155)	Disability and Society (40) (UK)	Florian, L. (13)	NorgesTeknik-Naturvitenskapelige Universitet (22)	S. Africa (108)	Computer Science (114)
7	2008 (119)	British Journal of Special Education (33) (UK)	Engelbrecht, P. (13)	Open University (21)	Canada (96)	Engineering (39)
8	2007 (104)	Revista De Educacion (31) (Spain)	Deppeler, J. (13)	Rijksuniversiteit Groningen (19)	Norway (67)	Nursing (37)
9	2006 (91)	Teaching and Teacher Education (28) (UK)	Norwich, B. (12)	Syracuse University (19)	Sweden (50)	Eco.,Econometr. and Finance (36)
10	2005 (69)	Res. and Pract. for Persons with Severe Disabilities (28) (USA)	Humphrey, N. (12)	University of Edinburgh (18)	Hong Kong (46)	Bus., Man. and Accounting (34)

Table 4 shows description of top 10 inclusive education search results for various categories retrieved from Google Scholar. There was no chronological sequence regarding production of documents in inclusive education research. Most of the documents (921) were produced in 2010 followed by the year 2013. Data for the year 2014 were included but production strength could not fall under top 10 years with respect to productivity. Top 10 influential sources had mostly books (eight books) and fewer research articles (two research articles). Author's affiliations in top 10 influential source documents were from USA and UK. Authors of four books and one research article included in top 10 influential resources were from USA and UK. Top 10 influential research journals in inclusive education were from UK (5), Korea (2), China (1), USA (1), and Canada (1).

Table 4. Top 10 search results about inclusive education research retrieved from Google Scholar

Rank	Year (Doc.)	Source (Type) (Citations) (Country)	Journal (Docs) (Country)
1	2010 (921)	Salvia, J., Ysseldyke, J., Bolt, S. (2012). <i>Assessment: In Special and Inclusive Education</i> . 12 th ed., Boston: Wadsworth Publishing Co. (Book) (1570) (USA)	International Journal of Inclusive Education. (516) (UK)
2	2013 (899)	Booth, T., Ainscow, M. (2002). <i>Index for inclusion: Developing learning and participation in schools</i> . Bristol: Index for inclusion: Developing learning and participation in schools. (Book) (870)(UK)	Chinese Journal of Special Education. (241) (China)
3	2011 (892)	Thomas, C. (1999). <i>Female forms: Experiencing and understanding disability</i> . Philadelphia: Open University Press. (Book) (788) (UK)	특수교육연구 (i.e. Special education) (90) (Korea)
4	2012 (877)	Sherrill, C. (1998). <i>Adapted physical activity, recreation and sport: Cross disciplinary and lifespan</i> . Boston: McGraw-Hill Co. (Book) (783) (USA)	British Journal of Special Education. (UK) (80)
5	2009 (852)	Fuchs, D. & Fuchs, L. S. (1994). Inclusive schools movement and the radicalization of special education reform. <i>Exceptional Children</i> , 60(4), 294-309. (Journal article) (871) (USA)	Support for learning. (UK) (72)
6	2000 (515)	Ainscow, M. (1999). <i>Understanding the development of inclusive schools</i> . London: Falmer Press. (Book) (737) (UK)	European journal of special needs education. (UK) (71)
7	2005 (500)	Avramidis, E. & Norwich, B. (2002). Teachers' attitudes towards integration/inclusion: A review of the literature. <i>European Journal of Special Education Needs</i> , 17(2), 129-147. (Journal article) (734) (UK)	교육공학연구 (i.e. Education Engineering Research) (Korea) (68)
8	2002 (500)	Friend, M. & Bursuck, W. D. (2002). <i>Including students with special needs: A practical guide for classroom teachers</i> . Boston: Allyn and Bacon. (Book) (726) (USA)	Disability & Society. (UK) (63)
9	2004 (492)	Ball, S., Maguire, M., & Macrae, S. (2013). <i>Choice, pathways and transitions post-16: New youth, new economies in the global city</i> . Hoboken: Taylor and Francis. (Book) (694) (UK)	Teaching exceptional children. (USA) (56)
10	2003 (471)	Turnbull, A. P. (1995). <i>Exceptional lives: Special education in today's schools</i> . New Jersey: Merrill (Book) (681) (USA)	Exceptionality Education Canada. (Canada) (48)

Inclusive education research data from Web of Science (Table 5) show that the major research articles were written by authors from universities in USA. Out of top 10 highly cited research articles, authors of five research articles were from USA, followed by three from UK, and two from Canada. In the same way, Table 4 shows top 10 most cited results retrieved from Scopus. Authors of five research articles were from UK, seconded by three from USA, and one each from Australia and Norway.

A comparison of results about leading research articles from Google scholar, Web of Science and Scopus showed that Google scholar had two journal articles among top 10 influential sources. WoS indexed one journal and Scopus indexed the other journal. Therefore, from Google Scholar search results out of these two search hits of articles, one article was on top of WoS results while the other was on the top of Scopus results. Neither Scopus nor Web of Science had both of the articles that popped up in Google Scholar search. In Google Scholar all other influential sources were books that completely fell out of scope of both WoS and Scopus.

Table 5. Top 10 cited papers in inclusive education in WoS

Cited Reference (Citations)(Country)
Fuchs, D. and Fuchs, L. S. (1994), Inclusive Schools Movement and the Radicalization of Special Education Reform. <i>Exceptional Children</i> , 60(4), 294-309. (229)(USA)
Riehl, C. J. (2000). The principal's role in creating inclusive schools for diverse students: A review of normative, empirical, and critical literature on the practice of educational administration. <i>Review of Educational Research</i> , 70 (1), 55-81.(78)(USA)
Lindsay, G. (2007). Educational Psychology and the Effectiveness of Inclusive Education/Mainstreaming. <i>British Journal of Educational Psychology</i> , 77, 1-24. DOI: 10.1348/000709906X156881 (75)(UK)
Hunt, P. & Goetz, L. (1997). Research on Inclusive Educational Programs, Practices, and Outcomes for Students with Severe Disabilities. <i>The Journal of Special Education</i> , 31(1), 3-29. DOI: 10.1177/002246699703100102 (72)(USA)

Lage, M. J., Platt, G. J., &Treglia, M. (2000). Inverting the Classroom: A gateway to Creating an Inclusive Learning. <i>The Journal of Economic Education</i> , 31, 30-43. DOI: 10.1080/00220480009596759 (69)(USA)
Lightfoot, J., Wright, S., & Sloper, P. (1999). Supporting Pupils in Mainstream School with an Illness or Disability: Young people's views. <i>Child: Care, Health and Development</i> , 25(4), 267-284. DOI: 10.1046/j.1365-2214.1999.00112.x (58)(UK)
Stanovich, P. J., & Jordan, A. (1998). Canadian teachers' and principals' beliefs about inclusive education as predictors of effective teaching in heterogeneous classrooms. <i>The Elementary School Journal</i> , 221-238. (48)(Canada)
Kennedy, C. H., Shukla, S., &Fryxell, D. (1997). Comparing the effects of educational placement on the social relationships of intermediate school students with severe disabilities. <i>Exceptional Children</i> , 64(1), 31-47. (46)(USA)
Humphrey, N., & Lewis, S. (2008). Make me normal: The views and experiences of pupils on the autistic spectrum in mainstream secondary schools. <i>Autism</i> ,12(1), 23-46. (46)(UK)
Pivik, J., McComas, J., &Laflamme, M. (2002). Barriers and facilitators to inclusive education. <i>Exceptional children</i> , 69(1), 97-107. (46)(Canada)

Table 6. Top 10 cited papers of inclusive education research in Scopus

Cited Reference (Citations)(Country)
Avramidis, E. & Norwich, B. (2002). Teachers' attitudes towards integration/inclusion: A review of the literature. <i>European Journal of Special Education Needs</i> , 17(2), 129-147. (236)(UK)
Lage, M. J., Platt, G. J., &Treglia, M. (2000). Inverting the Classroom: A gateway to Creating an Inclusive Learning. <i>The Journal of Economic Education</i> , 31, 30-43. DOI: 10.1080/00220480009596759 (196)(USA)
Riehl, C. J. (2000). The principal's role in creating inclusive schools for diverse students: A review of normative, empirical, and critical literature on the practice of educational administration. <i>Review of Educational Research</i> , 70 (1), 55-81. (128)(USA)
Lindsay, G. (2007). Educational Psychology and the Effectiveness of Inclusive Education/Mainstreaming. <i>British Journal of Educational Psychology</i> , 77, 1-24. DOI: 10.1348/000709906X156881 (108)(UK)
Hunt, P. & Goetz, L. (1997). Research on Inclusive Educational Programs, Practices, and Outcomes for Students with Severe Disabilities. <i>The Journal of Special Education</i> , 31(1), 3-29. DOI: 10.1177/002246699703100102 (100)(USA)
Humphrey, N., & Lewis, S. (2008). Make me normal!The views and experiences of pupils on the autistic spectrum in mainstream secondary schools. <i>Autism</i> ,12(1), 23-46. (92)(UK)
Campbell, J., Gilmore, L., & Cuskelly, M. (2003). Changing student teachers' attitudes towards disability and inclusion. <i>Journal of Intellectual and Developmental Disability</i> ,28(4), 369-379. (83)(Australia)
Lightfoot, J., Wright, S., & Sloper, P. (1999). Supporting pupils in mainstream school with an illness or disability: Young people's views. <i>Child: Care, Health and Development</i> , 25(4), 267-283. (79)(UK)
Barton, L. (1997). Inclusive education: Romantic, subversive or realistic? <i>International Journal of Inclusive Education</i> , 1(3), 231-242. (79)(UK)
Vislie, L. (2003). From integration to inclusion: Focusing global trends and changes in the western European societies. <i>European Journal of Special Needs Education</i> , 18(1), 17-35. (75)(Norway).

Discussion

A few biases of citation databases are identified in this study. Scopus is owned by Elsevier that has head office in Netherlands and Web of Science is owned by Thomson Reuters, with head office in USA. Their indexed contents are driven by individualistic selection policies and practices (Elsevier, 2015; Testa, 2012). Users need subscription for these databases. While Google Scholar is run by web crawler that compiles search results as automated task and searching contents is free of cost (Google, 2015). Background facts of these citation databases had clear reflections on results in this study. Broader picture from the results of inclusive education research area emerged with American dominance through WoS; predominantly high research productivity, most of the leading universities, more influential authors, and more influential research journals, and Britain dominance through Scopus on the same parameters. Conversely, Google Scholar presented geographically neutral results. Regarding strengths and weaknesses of overall coverage and scope, this study confirms results of the results of previous studies such as Bergman (2012), Li et al. (2010) and Jasco (2005).

Both commercial citation databases showed inclusive education as progressive research area in terms of research production as well as citation counts. Influential authors were of research journal articles and influential information sources were only research journals. In opposition, Google Scholar illustrated non-symmetry in year wise publishing of inclusive education research and continuous decline in citations during the last decade. Moreover,

influential sources were books and book authors were of key influence in this research area. These findings from Google Scholar are more realistic to very nature of a social science discipline and are alike to research conducted by Nederhof (2006) who supported influences of books and comparatively older citations in disciplines of social sciences.

Results in this study are contrary to the findings by Meho and Yang (2007) and Yang and Meho (2006) who suggested that inclusion of Google Scholar results into Scopus and Web of Science results give more accurate impact and ranking of authors. As mentioned above, Scopus and Web of Science have geographic representation in their results. If inclusion of Web of Science and Scopus results with automated system (i.e. Google Scholar) are justified for accurate representation of search results then what is the reason for excluding some other similar databases from China, Japan, or Korea.

Conclusion

Reference and citation-extended databases have their strengths and weaknesses. There is no 'one size fits all' case in research. These databases are better sources in supporting researchers for finding pinpointed and more relevant information with their discipline wise merits and demerits. It is important that researchers should be aware of strengths and weaknesses while using different databases in the course of conducting their research and studies. No doubt, bibliometric indicators are of enormous value to researchers for in-depth research and studies. Research in bibliometrics has well explained the impact of research and scholarly publishing that is valuable for researchers in the field.

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