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A Contemporary Citation Analysis of Geography Education Journals: 2009–2015

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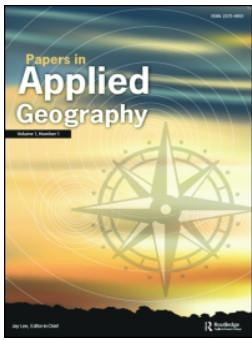


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RESEARCH ARTICLE

A Contemporary Citation Analysis of Geography Education Journals: 2009–2015

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ABSTRACT

This study examined the flow of citations from 713 documents emanating from ten geography education journals from 2009 to 2011. The citations generated from these articles were tracked within and between this set of journals from 2009 through 2015. Our searches found 1,067 citations, or an average of 1.5 citations per article. After excluding self-citations, the remaining citations (33.6 percent) filtered out into other geography education journals and were classified into three groups: splash, wave, and ripple. Although the *Journal of Geography in Higher Education* generated the largest in-degree count, it shared the lead with the *International Research in Geographical and Environmental Education* with seven undirected links. Three journals had six edges each, but only the *Journal of Geography* operated at the splash level of citation activity. The greatest volume of citation exchange occurred between the *Journal of Geography in Higher Education* and *Journal of Geography*, with the former sending thirty more citations than it received. The results herein provide active scholars with insight into research trends and thoughtful journal selection with the caveat that such knowledge might increase the acceptance of submissions and after publication generate more rapid dissemination, higher impact, and greater visibility.

KEYWORDS

Citations; geography education journals; publication; visualization

Contemporary geography education journals disseminate information in the context of research, teaching, and learning. Johnston (2003) presented the following question: “[I]s the circulation of knowledge through academic journals largely confined within separate disciplinarian containers?” (135). Numerous scenarios come to mind (*i.e.*, geography journals citing geography journals, geography journals citing nongeography journals, *etc.*). The focus here, though, begins with an examination of geography education journals citing geography education journals. Liu and Wang (2005) established that within-discipline communication dominates among demography journals, and so partially answers Johnston’s question. Assuming a similar pattern of communication exists within geography education circles, our objectives herein are to (1) visualize the exchange of citations between the leading journals in geography education, and (2) identify the journals functioning as conduits for sending and receiving citations. Further, the thirty most cited articles from our database will be categorized according to a citation ranking scheme using ripple-making (lowest), wave-making, or splash-making (highest) papers (Foster *et al.* 2007); and finally, these most-cited articles were coded with a three-tiered research agenda proposed almost a decade earlier by a leading scholar in geography education (S. Bednarz 2000).¹

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¹Taylor & Francis Online (<http://www.tandfonline.com/page/article-metrics>) counts eighty-seven views of S. Bednarz’s (2000) article from 25 June 2011 to 30 April 2016. Because this article first appeared in print in 2000, more than ten years before online counting began, one can reasonably assume the number of views from 2000 to the present is much higher. Bednarz is a prominent scholar with a long history of advocacy for cutting-edge research in geography education. She was the 2015–2016 president of the American Association of Geographers.

This study then quantifies the production of knowledge (2009–2011) and its dissemination via the sending and receiving of citations across a suite of geography education journals (2009–2015). Our time frame covers a more recent period (2009–2015) so scholars might adjust their research trajectories to recommended directions in geography education and to target submissions (Che 2010; Zawacki-Richter and Anderson 2011) to appropriate journals with the disseminating power to showcase significant research.

Background

Geographers have used citation indexes to assess a single author's contribution to the field (Persson and Ellegård 2012), determine “classics” status of articles and books (Wrigley and Matthews 1986), measure the influence among economic geographers (Bodman 2010), examine citation patterns for a subfield (i.e., economic geography; Foster *et al.* 2007), graph the network of relations among a set of geographical journals (Gatrell and Smith 1984), and rank and evaluate programs, departments, and institutions (Turner and Meyer 1985; Foster *et al.* 2007; Coomes *et al.* 2013).

Although precedence exists for using citation indexes to measure academic performance, citation databases (i.e., Thomson ISI) have inherent inadequacies that must be acknowledged. For example, citation indexes have an Anglophone bias with their dominance of UK and U.S. scholars and publishers. Further, as Foster *et al.* (2007) stated, an undercurrent of citation behavior “reflects a complex amalgam of factors: cliquish name-checking and tribal identification; recycling ‘standard’ references; pandering and hat-tipping to powerful figures; self citation; sporadic preoccupations with controversial papers, opinionated editorials and zeitgeist-capturing reviews; defensive or anxiety-induced over-citation” (296), which inflate citation counts. Another factor increasing an article's visibility is availability via free online accessibility. One report from the field of computer science puts the average number of citations for online articles at 7.03 compared with 2.74 for offline articles (Lawrence 2001). With most journals embracing some form of online or open access, such differentials should have decreased in recent years.

Cynics oppose the intrusion of corporate entities that arm university administrators with bibliometric ammunition to gauge faculty, departments, and institutions. Reliance on impact factors “stifles risk-taking scholarship and creative thinking, rewarding a production-line mentality” according to the Cynical Geographers Collective (2011, 190). Nevertheless, citation indexes provide data for appraising a discipline's theoretical and applied discourses and concurrent “spatial and institutional” connections, although these sources are not appropriate for determining “the best” article, author, or journal (Foster *et al.* 2007, 297). Cross-citation analysis facilitates visualization of information flowing between journals, and enables “researchers, publishers, and information specialists to select more accurately the outlet and consumption patterns for scholarly research” (Zawacki-Richter and Anderson 2011, 442). Weingart (2005) advocated an “informed peer review” where traditional peer review is pillared with bibliometrics, and provides more balance and objectivity to faculty evaluations. In our experience serving at a doctoral-intensive university, faculty have already begun including bibliometrics to support tenure, promotion, posttenure, merit, and market adjustment dossiers. The evaluators, from one's tenure-unit faculty, outside peer reviewers, and administrators from the chair, dean, and provost, to president have access to citation indexes to render recommendations and professional decisions (Hodge and Lacasse 2011). So although authors should concentrate first on addressing important research questions, it is advantageous to consider journal selection vis-à-vis citation exchange to ensure dissemination of findings, ideas, and recommendations to the most appropriate target audiences.

Method

The authors searched for national and international journals available in English that focused on geography education. State- or provincial-level journals were excluded, as well as journals in languages other than English. Foster *et al.* (2007) recognized an Anglocentric (UK, U.S., and Canada) dominance of authors, institutions, and publishers supporting economic geography, which parallels the geography

Table 1. Selected list of geographic education journals from 2009–2015.

Title	Affiliation(s)	Publisher
<i>European Journal of Geography</i> <i>Focus on Geography</i>	European Association of Geographers American Geographical Society of New York	European Association of Geographers Wiley Online Library
<i>Geographical Education</i>	Australian Geography Teachers' Association	Australian Geography Teachers' Association
<i>Geography</i> <i>International Research in Geographical and Environmental Education</i>	Geographical Association International Geographical Union, Commission on Geographical Education	Geographical Association Routledge: Taylor & Francis Group
<i>Journal of Research and Didactics in Geography</i>	Italian Association of Geography Teachers	Edizioni Nuova Cultura
<i>Journal of Geography</i> <i>Journal of Geography in Higher Education</i>	National Council for Geographic Education University of Chester, UK; University of Nottingham Ningbo China	Routledge: Taylor & Francis Group Routledge: Taylor & Francis Group
<i>Primary Geography</i> <i>Research in Geographic Education</i>	Geographical Association Texas State University–San Marcos	Geographical Association Gilbert M. Grosvenor Center for Geographic Education
<i>Review of International Geographical Education Online</i>	Geographical Association, National Council for Geographic Education, European Association of Geographers, Italian Association of Geography Teachers, and International Network for Learning and Teaching Geography	RIGEO is published in cooperation with the Faculty of Education in Eskisehir Osmangazi University, Turkey
<i>Teaching Geography</i> <i>The Geography Teacher</i>	Geographical Association National Council for Geographic Education	Geographical Association Routledge: Taylor & Francis Group

Note: Although most of these publications are matter-of-fact geography education journals, it is not immediately obvious that *Focus on Geography* belongs here. Further inspection suggests otherwise, however; refer to FOCUS's Aims and Scope that "Instructors at all levels use FOCUS articles for lesson plans, lecture content, and for reading assignments." See the following link to read the Aims and Scope for this journal in its entirety: [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1949-8535/homepage/ProductInformation.html](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1949-8535/homepage/ProductInformation.html).

education scene. Our list of journals was compiled using a combination of two strategies: (1) selecting the top ten "geography education" scholars within Google Citations and searching their titles for geography education journals, and (2) obtaining expert opinions: conversations with a past president of the National Council for Geographic Education (M. DeMers, personal communication 20 November 2015) and senior research assistant at the Grosvenor Center for Geographic Education (J. Zadrozny, personal communication 19 November 2015). The initial list of geography education journals considered thirteen publications (Table 1). These journals differ in the number and type of documents published because their respective reading audiences fall along continua criss-crossing national versus international with teaching versus scholastic interests. For example, one journal might focus more on longer research articles and another on shorter lighter articles, lesson plans, or book reviews.

Because this study focuses on the status of information flow at the turn of the most recent decade, plus or minus one year, three journals from the set of thirteen were excluded from analysis; the excluded journals were the *European Journal of Geography*, *Journal of Research and Didactics in Geography*, and *Review of International Geographical Education Online* (Table 2). The exclusions were recent additions to the suite of geography education journals and had no data for one or more of the surveyed years (2009–2011). The ten target journals are accessible worldwide via university libraries, citation databases, and direct purchase or society membership.

Our methodology follows a three-step process involving data collection, analysis, and interpretation for this investigation. In Step 1 SCOPUS's Compare Journal function facilitated the creation of a database of citable documents from 2009 to 2011 (Elsevier Science Publishers 2015). Infrequently cited documents such as editorial prefaces, book reviews, and event reports were excluded from analysis. In Step 2, a temporal window spanning from 2009 to 2015 formed the period for extracting citation counts for a destination database (Table 3) and subsequent visualizations (Figures 1 and 2; Demsar 2009). The collection window, therefore, ranged among seven, six, and five years, respectively, for articles published from 2009 to 2011. The three-year origin

Table 2. Selected journals with inception, indexes, and open access status.

Title	Code	Inception	Indices	Open access
<i>Focus on Geography</i>	FG	1994	SCOPUS	Open access available for a fee
<i>Geographical Education</i>	GE	1969	Australian Geography Teachers Association	Issues are available for download starting with Volume 26 (2013)
<i>Geography</i>	G	1927 Vol. 14 (1); formerly <i>The Geographical Teacher</i>	SCOPUS, SSCI	Access for subscribers; fee for nonmembers
<i>International Research in Geographical and Environmental Education</i>	IRGEE	1992	SCOPUS, ESCI	Open access available for a fee
<i>Journal of Geography</i>	JG	1902	SCOPUS, SSCI	Open access available for a fee
<i>Journal of Geography in Higher Education</i>	JGHE	1977	SCOPUS, SSCI	Open access available for a fee
<i>Primary Geography</i>	PG	2004	Membership to Geographical Association	Access for subscribers; fee for nonmembers
<i>Research in Geographic Education</i>	RGE	1999	The Gilbert M. Grosvenor Center for Geographic Education, Texas State University	No; abstracts are available at http://rge.grosvenor.txstate.edu
<i>Teaching Geography</i>	TG	1975	SCOPUS	Access for subscribers; fee for nonmembers
<i>The Geography Teacher</i>	TGT	2004	SCOPUS	Open access available for a fee

Note: SSCI = Social Science Citation Index; ESCI = Emerging Sources Citation Index.

window guards against a single journal volume that might be unrepresentative of the number and quality of citable documents. Gatrell and Smith (1984) used two three-year windows—1970 to 1972 and 1980 to 1982—and multidimensional scaling to depict the relative location and movement of journal metrics between the two time periods. Other citation studies have employed two-year (Doreian and Fararo 1985; Liu 2007), four-year (Liu and Wang 2005), and six-year windows (Zawacki-Richter and Anderson 2011). SCImago (2007), powered by SCOPUS, uses two-, three-, and four-year windows for reporting cites per document. Our three-year origin window meshes with other studies; however, our collection window of five to seven years extends the time frame from that of the studies mentioned. In Step 3, the thirty most frequently cited articles were coded using S. Bednarz's (2000) proposed research agenda for geography education.

Table 3. Citation Matrix C indicating from and to citations, 2009–2015.

Journal	<i>j</i> = Cited journal (sending)										Total
	FG	GE	G	IRGEE	JG	JGHE	PG	RGE	TG	TGT	
	<i>i</i> = Citing journal (receiving)										
FG	7	0	0	0	1	0	0	0	0	0	8
GE	0	25	11	13	3	5	3	0	9	0	69
G	0	3	51	10	1	2	7	0	27	0	101
IRGEE	0	5	12	162	12	7	1	0	4	1	204
JG	0	0	2	25	86	62	0	2	1	1	179
JGHE	0	0	4	6	32	312	0	1	7	2	364
PG	0	1	3	1	0	0	10	0	1	1	17
RGE	0	0	0	12	14	6	0	2	0	5	39
TG	0	0	10	3	0	2	1	0	52	0	68
TGT	1	0	0	4	7	2	0	2	1	1	18
Total	8	34	93	236	156	398	22	7	102	11	1,067
In-degree (excludes diagonal)	1	9	42	74	70	86	12	5	50	10	359

Note: FG = *Focus on Geography*; GE = *Geographical Education*; G = *Geography*; IRGEE = *International Research in Geographical and Environmental Education*; JG = *Journal of Geography*; JGHE = *Journal of Geography in Higher Education*; PG = *Primary Geography*; RGE = *Research in Geographic Education*; TG = *Teaching Geography*; TGT = *The Geography Teacher*.

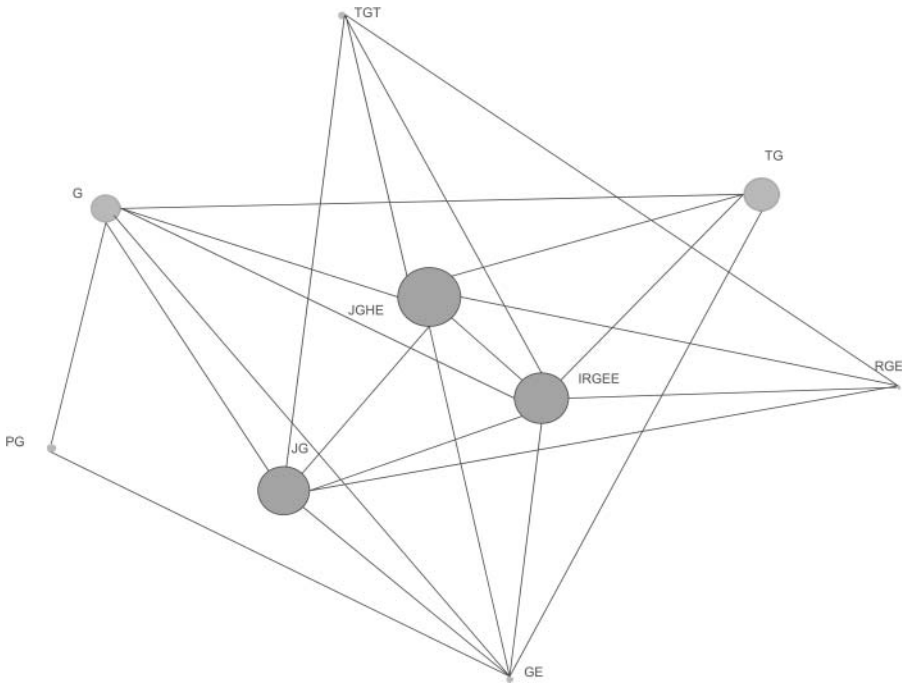


Figure 1. The citation network of 1,067 articles from the selected journals (2009–2015). The sizes of the vertices are graphically presented in terms of their total citation connections. The three most frequently cross-referenced journals are visualized as three large nodes in the center of the network, representing the most cited journals. *Note:* FG = Focus on Geography; GE = Geographical Education; G = Geography; IRGEE = International Research in Geographical and Environmental Education; JG = Journal of Geography; JGHE = Journal of Geography in Higher Education; PG = Primary Geography; RGE = Research in Geographic Education; TG = Teaching Geography; TGT = The Geography Teacher.

S. Bednarz’s (2000, 136) typology for geography education includes three substantive geography education research categories. These include teaching strategies and methods (SM) that are “helpful and instructive, but do not link constructively to prior research in education, geography, or geography education”; research on learning and thinking (LT) that “explain(s) geography learning and thinking phenomena using educational theory” and “applies positive (empirical, quantitative) or post-positivist

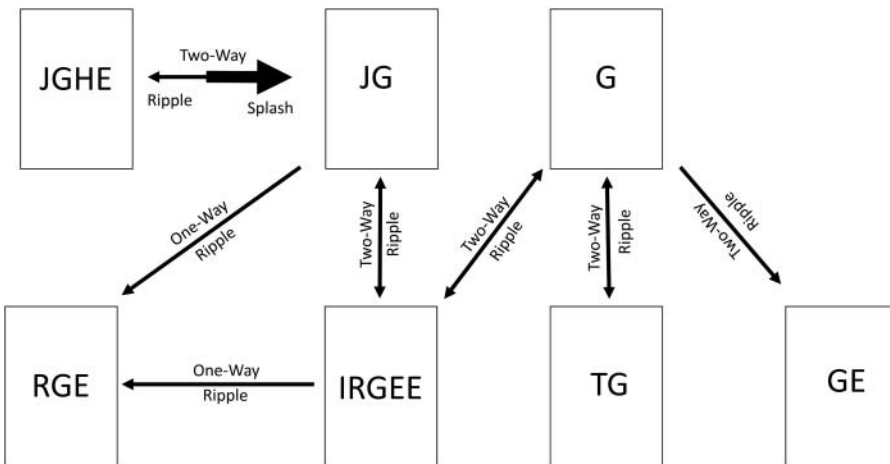


Figure 2. Ripple and greater interactions, one- and two-way connections. *Note:* GE = Geographical Education; G = Geography; IRGEE = International Research in Geographical and Environmental Education; JG = Journal of Geography; JGHE = Journal of Geography in Higher Education; RGE = Research in Geographic Education; TG = Teaching Geography.

(qualitative) methodologies”; and studies on institutional geography (IG) education, which are descriptive and attempt to “explain the form and process of various geography education issues.” For example, this particular piece on citation exchange between geography education journals would fit into the IG category. Studies not fitting into the SM, LT, or IG categories form a general interest (GI) category. For comparison herein, this study employed these same four categories with one coding for each article per S. Bednarz (2000, 136). After downloading the Portable Document Format files (PDFs) of the thirty most frequently cited articles from the 2009 to 2011 origin database, the articles were categorized using the aforementioned agenda for geography education. The articles were categorized as fitting into either SM, LT, IG, or GI categories. Several days later, and without consulting the initial results, the process was repeated anew. Next, the initial and subsequent lists were compared; those articles that were not coded the same in both attempts were reevaluated a third time for a final determination. This was a challenging exercise, as some articles contained elements of more than one research theme; however, the dominant theme is recorded herein.

Finally, the thirty articles were categorized using the ripple, wave, and splash scheme that ranks citation activity. Ripple-status articles have at least ten but fewer than forty citations; wave-status articles have between forty and fifty-nine cites; and splash-status articles have sixty or more citations. The lower cutoff is arbitrary, but articles with a least ten citations have “generated some attention,” while removing the “very long ‘tail’ of only modestly or uncited papers” (Foster *et al.* 2007). Although removing such a tail is a nonissue when selecting the most frequently cited articles, the minimum threshold (at least ten) reduced “noise” or extraneous links in the citation visualization (Figures 1 and 2). Wrigley and Overman (2010) employed Foster’s ripple-, wave-, and splash-making levels to analyze articles appearing during the first ten years of the *Journal of Economic Geography*. They found that 43 percent of articles from 2001 to 2007 achieved ripple status. Although somewhat arbitrary, the ripple, wave, and splash ranking system enlists a vivid analogy to contemplate the impact of research.

Pajek, version 4.10, is an open source software program that we used to visualize a network of citation exchange between journals (Batagelj and Mrvar 2016). It is important to note that there are two types of network structures, undirected and directed. The former points out the existence of an amorphous connection, whereas the latter depicts the directions of the linkages. For this study, first an undirected diagram of vertices and links provides an initial view of the citation exchange between journals. Vertices were normalized by in-degree citation counts (excludes diagonal counts) and depict the relative importance of a journal’s citation generation; only undirected links of more than one citation are shown to reduce the “noise” of the exchange (Figure 1). A second visualization, using simple drawing tools, offers a more detailed look at both one-way and two-way citation links between journals with just ripple (ten citations or more) or greater interactions shown to illustrate the essence of exchange (Figure 2).

Results

Citable documents, 2009–2011

There are 713 citable documents originating from the ten geography education journals from 2009 to 2011; editorials, book reviews, and reports were excluded from analysis. Collectively, these citable documents were equally distributed across the three-year collection window. There was also a near equal distribution in the number of documents by year for individual journals. The leading contributors to citable documents included the *Journal of Geography in Higher Education* (JGHE) and *Primary Geography* (PG), with 235 items or 33 percent. The next ranked publications were *International Research in Geographical and Environmental Education* (IRGEE) and *Journal of Geography* (JG), with ninety-two and seventy-four citable documents, respectively, over the three-year period. These four journals contributed 57 percent of all citable documents, and although this is a majority, seven of the journals produced at least sixty citable documents each during the three-year collection window; the journals with the lowest share of citable documents were *Geographical Education* (GE) and *Research in Geographic Education* (RGE) with fewer than thirty documents each. The low numbers for these

journals reflect respective foci on specializing on learning and thinking articles (*RGE*) and publishing book reviews (*GE*). Although *RGE* regularly showcases articles from leading scholars in geography education, its small print run is distributed without a major publishing house. The percentage of citable documents by journal is as follows: *FG* = 8.8, *GE* = 3.8, *G* = 10, *IRGEE* = 12.9, *JG* = 10.4, *JGHE* = 16.4, *PG* = 16.5, *RGE* = 4.1, *TG* = 11.5, and *TGT* = 5.6 (Elsevier Science Publishers 2015).

Tracking citation history, 2009–2015

The 713 citations generated from these 2009 to 2011 articles were tracked across these journals from 2009 through 2015. Our searches found 1,067 citations, or an average of 1.5 citations per article during the seven-year time frame (Table 3). Self-cites (for our purposes an author citing an article from the same journal publishing his or her article) comprised 66.4 percent (708) of all citations. This propensity for self-citations establishes a self-perpetuating looping connection within the same reading or membership audience. The remaining 33.6 percent (359) of the articles filtered out to the other geography education journals; these were analyzed for patterns of exchange.

After excluding self-cites, three of the ten journals acquired splash status (Foster *et al.* 2007) for citing sixty or more articles from other journals; from highest to lowest these were *JGHE* (eighty-six), *IRGEE* (seventy-four), and *JG* (seventy; see Table 3). Although these same journals also had the highest percentage of self-cites with *JGHR* (85.7 percent), *IRGEE* (79.8 percent), and *JG* (48.0 percent), notwithstanding their propensity to self-cite, these journals dominated the citation matrix (Table 3). Although self-citing could be viewed as insular, it might represent an ongoing disciplinary conversation with participants expecting to see that materialize in the same publication.

Visualization

Figure 1 depicts a visualization of the flow of information (citations) from 2009 to 2015. The size of each node or vertex is proportional to each journal's in-degree count (excludes diagonal counts or self-cites within the same journal) and designates the relative importance of a journal to the network (Table 3). The undirected linkages or citations between journals are shown as edges, and exchanges with counts greater than one are shown. Requiring more than one citation removed some "noise" or tenuous edges in the visualization, as such low-level interaction doesn't constitute a sufficient level of communication.

The vertex representing *JGHE* has the highest in-degree citations, followed by *IRGEE* and then *JG*. *Teaching Geography* (*TG*) and *Geography* (*G*) operate at the wave level in the network (Figure 1). The edges in the network depict how connected the journals were in relation to citing each other. *JGHE* enjoyed the largest in-degree count, followed by the *IRGEE* with the greatest number of bidirectional links with seven. Further, *JGHE* had its greatest exchange with the *JG*, with the former sending thirty more citations than it received. Other journals well connected included *JG*, *G*, and *GE* with six edges. The remaining journals had four or fewer edges with minimal citation exchange, except for perhaps *TG* and *G*. Notice that *Focus on Geography* (*FG*) remained unconnected for not reaching above the single to or from citation threshold.

If limits are adjusted such that just edges with at least ripple-level citation counts (ten or greater) contribute to the network, the pattern of exchange becomes more nuanced. Table 3 presents a 10×10 matrix of citing and cited journals, C , such that c_{ij} is the number of times documents in journal i cited documents cited in journal j . With 100 cells and 1,067 citations, the tie density is 10.6 cites per matrix cell, which is similar with our choice of counting ripple-status (at least ten citations) linkages for the refinement of our visualization. Similarly, Gatrell and Smith (1984) reduced the number of relations between journals by selecting the highest twenty-five entries. This constraint limited the number of journals within the network from nine to seven (Figure 2); all the connections were ripples except for the one splash link (sixty or more citations) sent from *JGHE* to *JG* (Table 4). The most connected journals as measured by one-way (assigned one point) and two-way (assigned two points) exchanges were *JG*, *IRGEE*, and *G* with five; the other journals either had two (*JGHE*, *TG*, and *RGE*), or 1 in the case of

Table 4. Ripple and higher links, directionality, total citations, and sent–received ratio.

Journal	One-way (sent)	One-way (received)	Two-way	Connections ^a	Total citations	Ratio sent/received
<i>JG</i>	<i>RGE</i>	—	<i>JGHE, IRGEE</i>	5	144	0.66
<i>IRGEE</i>	<i>RGE</i>	—	<i>JG, G</i>	5	71	1.96
<i>G</i>	<i>GE</i>	—	<i>IRGEE, TG</i>	5	70	0.89
<i>JGHE</i>	—	—	<i>JG</i>	2	94	1.94
<i>TG</i>	—	—	<i>G</i>	2	37	2.70
<i>RGE</i>	—	<i>JG, IRGEE</i>	—	2	26	0
<i>GE</i>	—	<i>G</i>	—	1	11	0

Note: GE = Geographical Education; G = Geography; IRGEE = International Research in Geographical and Environmental Education; JG = Journal of Geography; JGHE = Journal of Geography in Higher Education; RGE = Research in Geographic Education; TG = Teaching Geography.

^a2 points = two-way; 1 point = one-way.

GE's one-way exchange with *G*. This last exchange perhaps illustrates generic linkages (scholarly associations) occurring within the Commonwealth of Nations. Although the *IRGEE* and *JGHE* maintained superiority as before, the former has more connections (five vs. two). The fact that *IRGEE* and *JGHE* sent twice the citations they received is indicative of their value to the geography education community. The greatest volume of citation exchange is between *JGHE* and *JG*, with the former sending at the splash level (sixty-two) and the latter receiving at a robust ripple level (thirty-two). One might consider *JGHE* a “breeder” journal, feeding *JG* and potentially the remaining journals via second-order connections (*RGE*, *IRGEE*, *G*, *TG*, and *GE*). *G* slightly enhanced its status over the *JG* using the ten citation sent and received constraint. Although *G* and *JG* have two two-way and one one-way connections each (five points), *JG* had more than twice the volume of citations, and therefore is still the prominent journal. The strong two-way exchange between *TG* and *G* is understandable, as these are both publications of the same parent organization, the Geographical Association. Although *TG* has the highest ratio of sent to received citations, the volume is too small to improve its status outside the United Kingdom (Table 4). The results support the notion that *JGHE* operates as a monolith feeding the other journals' citations. Although its weakness is a low connectivity, namely to and from *JG*, its high volume of citations (ninety-four) and ratio of sent to received citations (1.94) give it clout among the other journals. Its minimal connectivity is partly compensated for through the appearance of its citations in the more connected *JG*, which exchanges with *IRGEE* and *RGE*. With their one-way receiving status, *RGE* and *GE* are spurs when the network is constrained to ripple (ten or more citations) connections.

Frequently cited papers in geography education from 2009 to 2015

The thirty most frequently cited articles within the network were classified and evaluated according to a research typology proposed for geography education (S. Bednarz 2000). This is a three-pronged typology consisting of foci that include teaching SM, LT, and IG research; articles not fitting within these categories were labeled as GI (S. Bednarz 2000; see Table 5). S. Bednarz (2000) found most (55 percent) of the articles appearing in *JG* from 1988 to 1997 were on SM. For the remaining categories, the percentages included 16 percent IG, 10 percent LT, and 18 percent GI. After splitting the analysis into two time periods (1988–1993 and 1994–1997), however, Bednarz found an increasing percentage of articles on LT (7.5 percent to 14.5 percent), and especially for IG (6.3 percent to 28.0 percent) over the two time periods. Increasing commitment in these two less represented areas will help geography educators “gain status with colleagues in other subfields of academic geography” (S. Bednarz 2000, 138).

The results herein provide active scholars with insight into research trends and journal selection to improve opportunities for publishing studies with the potential to generate higher impact, dissemination, and visibility. The set of most frequently cited articles was created using Publish or Perish—software designed to retrieve and analyze academic citations from Google Scholar (Harzing 2007). Google Scholar captures a wider range of citation sources (journals, books, reports) than does either ISI or SCOPUS (Coomes *et al.* 2013); however, for comparison, SCOPUS citations are given (Table 5). To identify the most frequently cited articles, our primary index was Google Scholar for its inclusiveness.

Table 5. Research category and current status (ripple, wave, or splash) of most-cited articles.

Author(s)	Year	Title	Journal	Google Scholar cites	SCOPUS cites	Typology
Y. H. Chionh and B. J. Fraser	2009	Classroom environment, achievement, attitudes and self-esteem in geography and mathematics in Singapore	<i>IRGEE</i>	93	33	LT
J. Lee and R. Bednarz	2009	Effect of GIS learning on spatial thinking	<i>JGHE</i>	88	52	LT
N. Esa	2010	Environmental knowledge, attitude and practices of student teachers	<i>IRGEE</i>	76	39	IG
A. Revell and E. Wainwright	2009	What makes lectures “unmissable”? Insights into teaching excellence and active learning	<i>JGHE</i>	63	27	LT
M. Hope	2009	The importance of direct experience: A philosophical defense of fieldwork in human geography	<i>JGHE</i>	55	39	SM
C. Jarvis and J. Dickie	2010	Podcasts in support of experiential field learning	<i>JGHE</i>	55	27	SM
T. R. Baker, A. M. Palmer, and J. J. Kerski	2009	A national survey to examine teacher professional development and implementation of desktop GIS	<i>JG</i>	53	23	IG
P. Mitchell and P. Forer	2010	Blended learning: The perceptions of first-year geography students	<i>JGHE</i>	51	29	LT
I. Jo and S. W. Bednarz	2009	Evaluating geography textbook questions from a spatial perspective: Using concepts of space, tools of representation, and cognitive processes to evaluate spatiality	<i>JG</i>	45	20	LT
S. Kindon and S. Elwood	2009	More than methods—Reflections on participatory action research in geographic teaching, learning and research	<i>JGHE</i>	42	28	SM
J. Cameron, K. Nairn, and J. Higgins	2009	Demystifying academic writing: Reflections on emotions, know-how and academic identity	<i>JGHE</i>	38	18	GI
T. Ferguson	2009	The “write” skills and more: A thesis writing group for doctoral students	<i>JGHE</i>	38	18	SM
H. C. Alberts, H. D. Hazen, and R. B. Theobald	2010	Classroom incivilities: The challenge of interactions between college students and instructors in the US	<i>JGHE</i>	36	9	GI
S. Hennemann and I. Liefner	2010	Employability of German geography graduates: The mismatch between knowledge acquired and competences required	<i>JGHE</i>	34	31	IG
C. C. Lam, E. Lai, and J. Wong	2009	Implementation of geographic information system (GIS) in secondary geography curriculum in Hong Kong: Current situations and future directions	<i>IRGEE</i>	32	13	IG
A. M. Bodzin and L. Cirucci	2009	Integrating geospatial technologies to examine urban land use change: A design partnership	<i>JG</i>	31	12	SM
Y. Liu, <i>et al.</i>	2010	PBL-GIS in secondary geography education: Does it result in higher-order learning outcomes?	<i>JG</i>	30	10	LT
S. Elwood	2009	Integrating participatory action research and GIS education: Negotiating methodologies, politics and technologies	<i>JGHE</i>	30	20	SM
C. Arrowsmith, <i>et al.</i>	2011	Student employability and its implications for geography curricula and learning practices	<i>JGHE</i>	30	23	IG
D. S. Sinton	2009	Roles for GIS within higher education	<i>JGHE</i>	29	17	IG

(Continued on next page)

Table 5. (Continued)

Author(s)	Year	Title	Journal	Google Scholar cites	SCOPUS cites	Typology
A. J. Hovorka and P. A. Wolf	2009	Activating the classroom: Geographical fieldwork as pedagogical practice	<i>JGHE</i>	28	26	SM
D. R. E. Cotton, A. Stokes, and P. A. Cotton	2010	Using observational methods to research the student experience	<i>JGHE</i>	27	7	GI
D. DiBiase and K. Kidwai	2010	Wasted on the young? Comparing the performance and attitudes of younger and older US adults in an online class on geographic information	<i>JGHE</i>	27	9	LT
A. Dunphy and G. Spellman	2009	Geography fieldwork, fieldwork value and learning styles	<i>IRGEE</i>	26	18	LT
S. D. Prager and B. Plewe	2009	Assessment and evaluation of GIScience curriculum using the geographic information science and technology body of knowledge	<i>JGHE</i>	25	16	LT
L. Bondi	2009	Teaching reflexivity: Undoing or reinscribing habits of gender?	<i>JGHE</i>	25	17	SM
K. Schroeder, <i>et al.</i>	2009	First, do no harm: Ideas for mitigating negative community impacts of short-term study abroad	<i>JG</i>	24	8	IG
A. Demirci	2011	Using geographic information systems (GIS) at schools without a computer laboratory	<i>JG</i>	24	7	SM
K. E. Foote	2010	Creating a community of support for graduate students and early career academics	<i>JGHE</i>	24	14	GI
N. Moore and M. Gilmartin	2010	Teaching for better learning: A blended learning pilot project with first-year geography undergraduates	<i>JGHE</i>	24	12	SM

Note: *IRGEE* = *International Research in Geographical Education*; *JG* = *Journal of Geography*; *JGHE* = *Journal of Geography in Higher Education*; LT = learning and thinking; IG = institutional geography education; SM = teaching strategies and methods; GI = general interest. Rows have been shaded to designate those article gaining ripple status for 10 to 39 citations or lightest gray, wave status for 40 to 59 citations or medium gray, or splash status for 60 or more citations or darkest gray. Source: Google Scholar citations extracted using Publish or Perish, Version 4.24.0 on 16 January 2016 (Harzing 2007); SCOPUS citation counts as of 2 May 2016.

SCOPUS indexed just seven of the ten geography education journals, but its citation counts are shown for comparison. Foster *et al.* (2007) used Google Scholar to determine the thirty most frequently cited economic geography papers of the 2000s, and the authors emulated this strategy. Thus, the top thirty most frequently cited articles from the 2009 to 2011 origin collection generated 1,169 citations as of 16 January 2016. Because these articles are still potentially citable, it is important not to consider Table 5 as a list of “the best” articles, as these are in flux, with more potential citations on the horizon.

There are substantial differences between a cultivated database like SCOPUS and Google Scholar. SCOPUS searches through only the journals that Elsevier wants to index. For example, the most frequently cited article lists thirty-three under Scopus (2 May 2016), but ninety-three under Google Scholar (16 January 2016; see Table 5). This is because Google Scholar looks at a much larger number of “things” when it counts citations—many of which were not indexed in SCOPUS. Such differential counts are an inherent danger of relying on one index for calculating bibliometrics, as no index is perfect.

The most frequently cited article spawned ninety-three citations, whereas the four least cited articles each generated twenty-four citations (Table 5). These thirty articles recorded an average of forty citations and a median of thirty-two citations. The majority of the most frequently cited articles (twenty, or 67 percent) made just ripple status—the lowest tier of the ranking scheme. Just four articles (13 percent) obtained splash or the highest status with sixty or more citations, but produced 320 or a disproportionate 27 percent of total citations. Current ripple- and wave-status articles might advance one or more levels as more time passes.

Table 6. Citations of most-cited by research category.

Research category	Number of articles	Number of citations	Percent of total	Average number of citations per article
SM	10	352	30.1	35.2
LT	9	448	38.3	49.8
IG	7	244	20.9	34.8
GI	4	125	10.7	31.2
Totals	30	1,169	100	38.9

Note: SM = teaching strategies and methods; LT = learning and thinking; IG = institutional geography; GI = general interest.

The most frequently cited articles were categorized using S. Bednarz's proposed research agenda that advocates research on LT and IG over those concerning SM. Although these categories are straightforward, S. Bednarz (2000) elaborated on the characteristic nuances of each category for her analysis of articles published in *JG* from 1988 to 1997. Overall, ten articles (33.3 percent) were on SM, nine articles (30.0 percent) on LT, and seven (23.3 percent) on IG research; the remaining three articles were GI. These results support that scholarship, at least the most frequently cited, has increased in the LT and IG categories from 42.5 percent (1994–1997; S. Bednarz 2000) to our finding of 50.3 percent (2009–2011), with the most dramatic change in LT research from 14.5 percent to 30.0 percent across the two periods. It is revealing that the LT category of articles generated the largest share of citations (448, or 38.3 percent), as compared to 30.1 percent for SM, 20.8 percent for IG, and 10.7 percent for GI research (Table 6).

Just three of the geography education journals made it into the list of most frequently cited articles, with *JGHE* by far the most cited, at twenty or 67 percent of articles; much less represented were the *JG* and *IRGEE* (Table 5). *JGHE* accounted for the majority of articles in each of the ripple (thirty-nine and less), wave (forty to fifty-nine), and splash (sixty and greater) designations (Foster *et al.* 2007); further, a majority (five of nine) of the LT articles appeared in this same journal.

Discussion and conclusions

Separate analyses from prominent geographers from outside geography education all advise that scholarship in geographic education must become more engaging, rigorous, and critical if geography education is to be viewed as a serious subfield within geography (Brown 1999; Shelly 1999; Warf 1999). Specifically, Warf (1999) proposed that geography education venture past the “simple-minded exercise in memorization” (589) and infuse ideas from social theory and political economy. Shelly (1999) called for a reinterpretation of geography education along the lines of communicative learning strategies to match our information-oriented society. Brown (1999) challenged those involved with geography education research to generate scholarship on par with those in other established fields such as economic and urban geography. Programs such as Texas State's Geographic Education PhD should produce geographers trained with the expertise to generate more substantial studies combining learning theory and geography (S. Bednarz 2000; R. S. Bednarz and Bednarz 2004). Those geographers without formal training in geography education (*i.e.*, PhD or EdD) might consider collaborating with geographers specially trained in geography education or those with education research credentials.

Table 7. Seven years of citations from 2009–2011 citable documents for three prominent journals.

	2009	2010	2011	2012	2013	2014	2015	Total
<i>IRGEE</i>	0	8	25	31	68	43	29	204
<i>JG</i>	0	2	12	17	62	62	24	179
<i>JGHE</i>	4	5	51	62	106	55	81	364

Note: *IRGEE* = *International Research in Geographical and Environmental Education*; *JG* = *Journal of Geography*; *JGHE* = *Journal of Geography in Higher Education*.

It is important to note, however, that our results are fluid, as inevitably our citable documents will continue to be referenced in future work. There is a strong temporal component affecting all our analyses because as expected there is a perfect negative correlation (-1) between number of most frequently cited articles and year of publication with eighteen (2009), ten (2010), and two (2011) articles, respectively (Table 6). Therefore, the number of citations these articles generate will increase before slowing to a trickle at some future date.

First, authors should engage in research because it is important, or offers a unique contribution. In deciding where to submit one's manuscript, however, the author should consider a journal's aims and scope to determine preferred content and instructions to authors for length, style, and other format requirements; for example, *JG* focuses on research articles, whereas *TGT* emphasizes lesson plans. Selecting journals with stronger and multiple citation connections with other journals might facilitate a faster and more dispersed dissemination should one's submission get accepted for publication. Potential authors might also consider submitting manuscripts with foci on learning and teaching, as this theme generated more citations per article than those in the other research categories. Also recognize that there is a lag time of four to six years for citations to reach a maximum; after that, an article begins to lose relevance. For example, the number of citations from our most frequently cited articles (2009–2011) peaked in 2013 for *IRGEE*, 2013–2014 for *JG*, and 2013 for *JGHE*; these articles will continue to generate interest, albeit with diminishing frequency (Table 7).

Other studies might consider collecting citations over a longer destination window, for example, over ten or fifteen years, rather the shorter time (an average of five years) for our investigation. Even then, some articles for whatever reason (random selection, historic value, reprinting, etc.) will see the printed page again, perhaps decades later. Because our objective is to understand more recent activities and themes in geography education, we chose contemporary time frames with origin (2009–2011) and destination (2009–2015) collection windows as indicated. Future studies should incorporate the nascent *European Journal of Geography*, *Review of Geographical Education Online*, and *Journal of Research and Didactics in Geography*. These three additions will go much to further toward the internationalization of geography education venues while fostering cutting-edge studies on geographic education. Other studies will focus on contributions to geography education journals from geography and nongeography journals and especially education journals (and vice versa).

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