

Scholarly Communication in Education Journals

The rise of disciplines is connected with the formation of groups or networks of specialists. It is connected with the emergence of “scientific communities,” theorized about since Thomas Kuhn and Robert Merton. But how is such a community of specialists brought together; how are common orientations among members of a scientific community upheld? In this article it is argued that scholarly journals play a key role in the modern scientific disciplines. Journals both secure the shared values of a scientific community and endorse what that community takes to be certified knowledge. Publications in scholarly journals have become the basic units of scientific communication in a discipline. Against this theoretical background, I analyze in this article the evolution of the leading scholarly journal in the field of education in the Dutch-language community, Paedagogische Studiën (Studies in Education). The analyses illuminate a number of historical evolutions in this journal in the period 1920–75: the increase in coauthorship and the concomitant standardization of publication formats; the changing role of the editorial board, especially in its function of gatekeeper of scientific communication; and the increase and the shifting “global” nature of cited work in the journal. Because of the close relationship between journal and discipline, this analysis highlights basic characteristics of the patterns of communication and the constitution of disciplinary identity in Dutch-language educational science.

Scientific specialization seems first of all an intellectual orientation of particular individuals. Such specialization depends on a decision to focus on a relatively small field of scientific activity. But, as with any such decision, individuals need a social context supporting it, that is, other individuals taking

the same decision. Decisions of this kind were still rare in the mid-eighteenth century, when encyclopedic orientations dominated among professional and amateur scientists alike. They gained prominence in the late eighteenth and early nineteenth centuries. For the most part, the “morphogenesis” of scientific disciplines and subdisciplines took place during the last two centuries.

The rise of scientific disciplines is connected with the formation of groups or networks of specialists. It is connected with the formation of specialized “scientific communities,” theorized about since Thomas Kuhn (1970; see also Coser 1965; Merton 1968: 531–627). But how are such communities of specialists brought together? How are common orientations among their members upheld? How do they evolve in national and transnational contexts? Recent attention has been directed to the rise of new and specialized forms of scientific communication, especially in or by means of scientific journals (Stichweh 1994; Reill 1998; Heilbron et al. 2008; see also Eisenstein 1979; Frickel and Gross 2005). It is now well known that the first nationwide specialized journals appeared in the last decades of the eighteenth century; they were characterized by a specific orientation on such subjects as chemistry, physics, mineralogy, and philology. But the establishment of specialized journals clearly also facilitates the formation of networks of (potential) authors.¹ These journals and the publications therein “control” the formation of scientific disciplines. They channel the communication between the members of scientific communities. The authors of articles accept the specialization chosen by the journal, but they also continually modify this specialization by the cumulative effect of their published findings. Seen from this point of view, scientific publications—embedded first in national, then in supranational networks—are of central importance to the crystallization of intellectual specializations and scientific disciplines.

This article presents a case study of the morphogenesis of the scientific community that focuses on education in the Dutch-speaking area of Europe (i.e., the Netherlands and the northern, Flemish part of Belgium). In this part of the Western world, the institutionalization of educational science mainly took place during the twentieth century. Historians of education often mark the official beginning of the discipline in the Netherlands as February 3, 1900: on that day the nation’s first lecturer in education (J. H. Gunning) delivered his inaugural address at the University of Utrecht. But it is not the determination of an organizational “zero point” that is of interest when one intends to study changing forms of communication in scien-

tific disciplines and communities. On the basis of an analysis of the flagship Dutch-language journal in education, *Paedagogische Studiën* (*Studies in Education*, henceforth *PS*), this article instead focuses on the changing forms and formats of communication in the Dutch-language community of educational researchers. It aims to provide a social and an epistemic fingerprint of the educational discipline in the Dutch-speaking part of the world.

PS lends itself very well to this kind of research.² Founded shortly after World War I, *PS* almost immediately established itself as the central disciplinary journal in the Dutch-speaking scientific community. It has covered a broad range of topics characteristic of the field of education and has run uninterrupted for several decades. Institutionally, *PS* has always been embedded in the public universities of the Netherlands. Overall, it can also be said that the journal has been well aware of its leading role in the field. It has celebrated its own history on several occasions (Noordam 1961; Jonker 1974; Depaepe and Bakker 1998; Vanderstraeten and Van Hilvoorde 2001). It has also remained recognized as the main general journal in the field of educational science in the Dutch-speaking parts of the Low Countries. But while reprints of several famous or “characteristic” older articles have been published on the occasion of its 75th anniversary, systematic analyses of changes in the publication and communication practices of *PS* have hitherto not been conducted.

The focus of the following analyses is on the period between 1920 and 1970 (or 1975, if extending the period provides a better picture of a particular trend). In 1970 *PS* changed both its layout and the spelling of its name— from the “archaic” *Paedagogische Studiën* to the “modern” *Pedagogische Studiën*. In this period *PS* also started to narrow its focus both substantively and methodologically, specializing in articles on school psychology. This repositioning was a reaction both to the increasing subdisciplinary specialization in the educational discipline and to the establishment of other generalist Dutch-language journals specializing in education (Deen and Velema 1974; Depaepe and Bakker 1998; Vanderstraeten and Van Hilvoorde 2001). Focusing on the first half century of *PS*’s existence, in which *PS* operated as an educational journal for the generalist Dutch or Flemish (or South African) reader, makes it possible to analyze major trends in the patterns of scholarly communication in the discipline of education in toto.

In the next section some general reflections on theoretical issues related to the formation of scientific communities are presented. Afterward the ana-

lyses focus in much more detail on the changing role of the editorial board of *PS* and on the uses or citations of publications in journal articles. The final section presents concluding reflections on the national and global orientation of research communities in the social sciences.

Journals and Disciplines

Hitherto accounts of the morphogenesis of science have generally focused on the university (e.g., Titze 1995; Horn 2003; Geiger 2004). The modern university is indeed the prime location where scientific research takes place, where new generations of researchers can be trained and recruited, and where scientific careers can be pursued. But these organizations are not the locations where research findings are communicated, published, and evaluated. Research findings are communicated in books and encyclopedias and at conferences, seminars, and workshops. Most of all, scientific communication has become dependent on journals and journal publications. For science, specialized journals have become the media of publication par excellence. More than books, scientific journals and journal articles reveal the collective character of scientific practice. They consist of a collection of different articles by different authors. And the diversity of the published contributions provokes reflection on the relationship between and the coherence of these different contributions.

In a general sense, it can be argued that journal publications (particularly in the form of articles) have become perceived as the privileged, if not ultimate, form of scientific communication. But scholarly journals not only enable the communication of research findings; they also influence how contributions to scientific communication can be made. In comparison with the production and circulation of books, periodicals perhaps first and foremost lead to the *rapid* succession of *small* contributions. Publications in periodicals succeed each other at short and regular intervals. Also, readers who subscribe to a scientific journal do not know in advance what issues will be raised in what ways in that journal. A journal thus evokes expectations that differ from the ones evoked by a scientific book. A journal is expected to present a picture of the state of the art of an entire field of inquiry (Luhmann 1990; Stichweh 1994). Seen against this background, the idea to discern the constitution and evolution of scientific disciplines by means of detailed analyses of scholarly journals seems to suggest itself.

Periodicals influence the temporal structure of the field of science. The periodicity of appearance presses scientists to publish at regular intervals (“publish or perish”). The findings of a journal article can already be superseded in the next issue of the journal. In the current age of online journals and preprints, the rate of scientific production seems once more to have accelerated, especially in disciplines that focus very much on the production of novelties (Brown 2001). Moreover, journals and their editorial boards can regulate and control access to scientific communication. Multiple norms and values, which have been developed within the system of science, directly bear on publication behavior. Discussions about what is and what is not a valid publication are age-old (Mantel 1980b; Hirschauer 2004). The current peer-review system puts up a barrier, but it also grants a minimal form of recognition or credit to published research findings. It endorses what the scientific community takes to be certified knowledge (Garfield 1985). No doubt, the scientometric instruments that have been developed in the past decades—such as Journal Citation Reports and Journal Performance Indicators—have strengthened the relevance of periodicals (e.g., Leydesdorff 2001; Moed 2005; Bornmann 2007).

Moreover, clearly restrictive conditions regarding what type of communication is acceptable for publication have been defined. There now exists a range of more or less explicit criteria that bear on the communication of research findings: for example, regarding the delineation of scientific problems, the specification of theoretical hypotheses, the presentation of the empirical evidence, the linkages with earlier publications by other scientists (through citations and references), the appropriate length of a single publication, and the admissibility of presenting speculative thoughts. Generally taken for granted, these criteria are mostly perceived as objective or timeless principles intended to guarantee certain standards and facilitate further research. They are not perceived as highly specific, contingent forms that exert pressure on the research process and determine the conditions of participation in the disciplinary communication processes. However, there has existed a range of inter- and intradisciplinary variations in both publication formats and forms of access to publication (see Bazerman 1988; Russell 1991; Haas 1996; Wouters 1999; Aaltojärvi et al. 2008).

The scientific publication has become a formal principle interfering in every scientific research process. The institutionalization of this publication imperative even discredits research that did not (yet) lead to this kind of

output. As long as no results are published, it is difficult—both institutionally and psychologically—to close off particular projects. Researchers only gain freedom to do something else, to move to new research projects, once they have been able to communicate the results of previous commitments to their peers by means of (refereed and high-ranked) journal publications. The institutionalization of this type of scientific publication also affects the way research is conducted. In a kind of feedback loop, publications or publication possibilities exert pressure on the scientific production process and thus contribute to the integration and identity of scientific disciplines (Stichweh 1994; Lenoir 1997).

These kinds of general considerations constitute the background for the following case study. Attention is hereafter directed to journal articles and publication practices in the Dutch-language scientific community that focus on education, as exemplified by *PS*. For the period between 1920 and 1970 *PS* is included in some bibliographical indexes. However, the coverage of the content of its older volumes is often incomplete and incorrect. Therefore a new dataset was composed, departing from every issue of the journal itself. The publications and articles on which data are presented are all those appearing in *PS*, with the exception of book reviews, news and conference notices, obituaries and tributes, editorials, or introductions to special issues. That left 1,550 articles published between 1920 and 1970. For each of these articles, the database includes a number of descriptive elements: author(s) and title, “status” of the authors (editor or not), institutional address (when available), and thematic and methodological keywords. All cited references (footnoted or provided in a bibliography) were processed too. The cited references were coded by language and source (book or journal article); references to other publications in *PS* itself were identified separately. Overall, the focus of this discussion is thus on aspects that can conveniently be addressed from a substantial body of broad quantitative material on the journal publications.³

Authors and Editors

From the outset *PS* conceived of itself as a scholarly journal. Most of the founding editors held research positions at Dutch (public) universities. The board has always been chaired by noted academics, among them J. H. Gunning (1919–38), Philip Kohnstamm (1938–51), and Philip Idenburg (1958–72). In the postwar era M. J. Langeveld played a leading role, although he

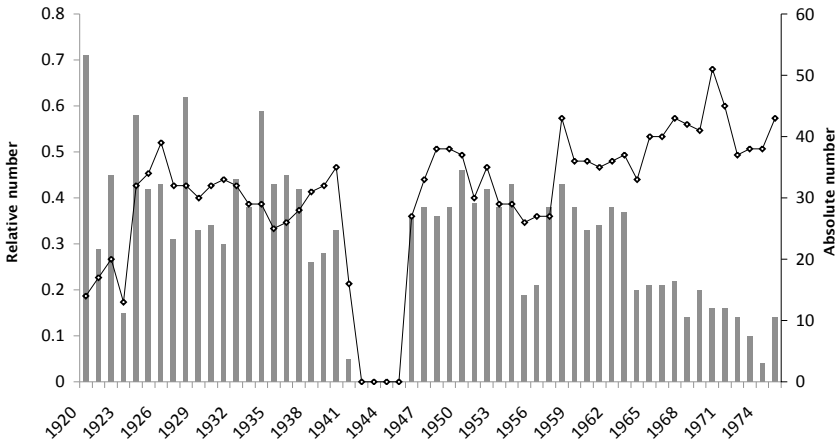


Figure 1 The productivity of the editorial board

Note: On the y -axis, the columns show the evolution of the relative number of articles authored by members of the editorial board. On the z -axis, the line indicates the evolution of the absolute number of articles published in each volume of *PS*.

never officially chaired *PS*'s editorial board. These editors clearly left their personal marks on the journal and the Dutch-language scientific community.

To highlight particular processes of scholarly production, figure 1 focuses on the role of the editorial board of *PS* in the period 1920–75. This figure displays the proportion of articles in *PS* that were written by members of the editorial board. Although there are some fluctuations, it can readily be seen that the role of the editorial board was redefined in the 1960s. Around 1950 the editorial board still authored almost half of all published articles. In the 1970s this proportion dropped to about 10 percent of the journal contributions. Thus the editorial board of *PS* came to play a less visible role in the scientific scene during this period, especially in comparison with the years before World War II. This change occurred because an increasing number of authors became less loyal to *PS* and wanted to publish in several journals. The rise of competing Dutch periodicals contributed to this trend.⁴ Moreover, publication in *PS* became less important to the editors' own academic careers. The number of ordinary or "full" university professors on the editorial board of *PS* increased steadily (in 1936, 22 percent; in 1946, 38 percent; in 1956, 44 percent; in 1966, 59 percent; in 1976, 63 percent; in 1986, 70 percent). It was a new and relatively large group of younger researchers that used the journal as a publication outlet for its work. The role of the edi-

torial board changed accordingly. Instead of filling the pages of the journal with their own contributions, the members of the editorial board became increasingly engaged as gatekeepers of scientific communication channels (see Gieryn 1999; Lamont and Molnár 2002).⁵

To complement the preceding analysis, table 1 provides an overview of the distribution of publications in *PS*. This table tries to answer the following questions: Who brings this community of specialists together? Whose interests dominate the scientific community? Does a select group write most articles, or are the majority written by a large group of authors who publish only once or twice in *PS*? Column 1 of this table lists the number of articles written by individual authors; column 2 lists the corresponding number of authors. Columns 3 and 4 display the evolution in terms of percentages. The names of the most productive authors of *PS* are given in column 5. An asterisk identifies the members of the editorial board among these productive authors. The last columns show the total number of articles (in absolute figures and percentages, respectively). For example, there are two authors (0.3 percent) who published 25 articles in the period 1920–70 (P. L. van Eck and G. van Veen); 98.6 percent of the authors published fewer than 25 articles each, but as a group they contributed only 75.4 percent of the articles published in *PS* (in absolute numbers: 1,169 out of 1,550).

Table 1 shows that 64.4 percent of the authors published only one article in *PS* between 1920 and 1970. On the other hand, 10 percent of the authors wrote more than half of the total amount of contributions. The eight most productive authors—all of whom were important members of the editorial board—together published almost 25 percent of all articles. The top three (I. van der Velde, Langeveld, and Kohnstamm) were responsible for 12.6 percent of all articles. In this period *PS* is thus characterized by an oligarchic pattern of scientific communication.⁶ Until the end of World War II, a limited number of editors and authors, all of them Dutch, unmistakably left its mark on *PS* and on educational research in the Netherlands. But from the 1960s on the discipline and the journal became less dependent on prominent figures with their particular individual interests. Instead, the work of a larger scientific community came to the fore in the journal. Knowledge claims have become less dependent on the person or authority of individual authors. The discipline has become less dependent on the achievements of a few “extraordinary” individuals but more on the epistemic or intellectual force of its scientific community.

Table 1 The productivity of the authors

Articles	Authors	%	Cum. %	Contributors	Total articles	Cum. % of total
1	376	64.4	64.4		376	24.3
2	99	16.9	81.3		574	37.0
3	36	6.2	87.5		682	44.0
4	19	3.2	90.7		758	48.9
5	14	2.4	93.1		828	53.4
6	6	1.0	94.2		864	55.7
7	4	0.7	94.9		892	57.5
8	6	1.0	95.9		940	60.6
9	1	0.2	96.1		949	61.2
10	3	0.5	96.6		979	63.2
11	3	0.5	97.1		1,012	65.3
12	2	0.3	97.4		1,036	66.8
14	1	0.2	97.6		1,050	67.7
15	2	0.3	97.9	H. J. F. W. Brugmans ^a ; C. Siewertsz van Reesema	1,080	69.7
16	1	0.2	98.1	L. van Gelder ^a	1,096	70.7
23	1	0.2	98.3	Ph. Idenburg ^a	1,119	72.2
25	2	0.3	98.6	P. L. van Eck; G. van Veen ^a	1,169	75.4
26	1	0.2	98.8	H. Nieuwenhuis ^a	1,195	77.1
27	1	0.2	99.0	H. Stellwag ^a	1,222	78.8
37	1	0.2	99.1	P. Post ^a	1,259	81.2
47	1	0.2	99.3	P. Diels ^a	1,306	84.3
48	1	0.2	99.5	J. H. Gunning ^a	1,354	87.3
60	1	0.2	99.7	I. van der Velde ^a	1,414	91.2
63	1	0.2	99.8	M. J. Langeveld ^a	1,477	95.3
73	1	0.2	100.0	Ph. Kohnstamm ^a	1,550	100.0
Total	584	100.0				

^aAlso a member of the journal's editorial board.

Along the same lines of analysis, figure 2 displays the evolution of the number of authors or coauthors per published article. Before 1941 a publication with more than one author was exceptional. There is on average not more than one coauthored contribution per annual in this period. Afterward the authorship of publications is increasingly shared with one or even more colleagues. Besides well-known strategic considerations, research-intrinsic

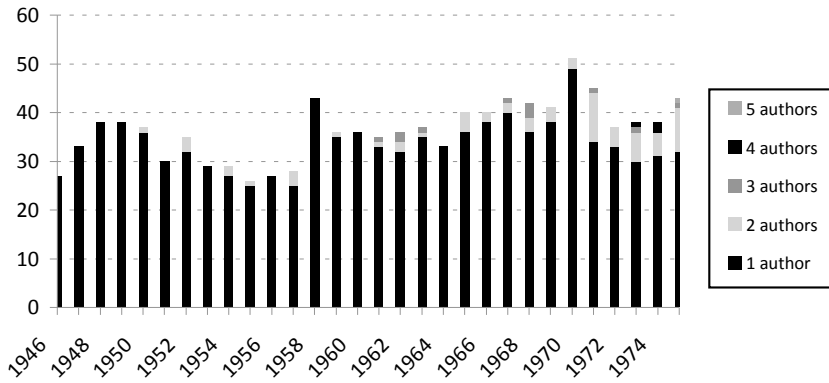


Figure 2 Number of authors per article

developments also influenced this evolution, as empirical research is often carried out in teams (see also Tenorth 1989; Keiner 1999).

The indexes of recent volumes of this journal, as well as of many other scholarly journals in the field of education, illustrate that the increase in coauthorship of articles has become more noticeable during the last decades. Moreover, the current rise of “virtual” journals tends to reinforce this trend. In fields such as physics, biology, mathematics, and information sciences, scholarly articles written by only one author have become highly exceptional (Zwart 2001: 26–29). Overall, this increase in coauthorship seems to go hand in hand with the further standardization of the methodology, terminology, and composition used in scholarly publications. In line with Michel Foucault (1995: 789–809), we might therefore speak of the “disappearance” and “effacement” of the author; the “subjectivity” of the author tends to be lost in specialized scholarly publications. Perhaps it is one of the contradictions of postmodern society that publications in scholarly journals have in recent years become *more* important for purposes of evaluating individual researchers and research groups.

Publications and Citations

As indicated before, references to other publications reveal the collective character of scientific practice. New findings are linked back to already published results (albeit often in a chaotic way). Each publication interacts with preceding ones by incorporating into its own line of reasoning arguments

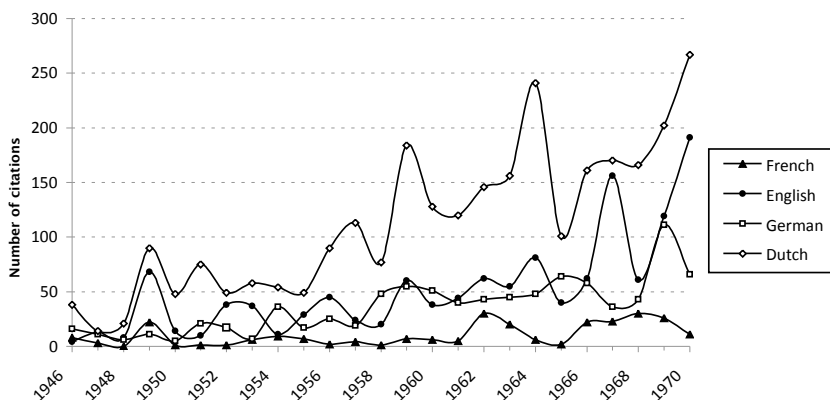


Figure 3 Language of citations

developed in other publications, and each new publication, due to the claims it makes to new knowledge, invites reactions and hence further publications. Citation analyses may thus provide insight into the communication structure of particular disciplines or scientific periodicals (Cronin 1984).⁷ I have made both a quantitative and a content analysis of *PS* between 1920 and 1970. The following questions underlie my analysis: What is the number of references to periodicals and books in *PS* articles, and how does this relationship evolve? To what extent do *PS* authors work with Dutch or non-Dutch sources? And is there an evolution in the relative use of German and English publications as has been observed with regard to the evolution of psychology in the Netherlands (see Van Strien 1993)? When these questions can be answered, a more complex social and epistemic fingerprint of the educational discipline can be provided. While the analysis of the preceding section focused on the “front stage” of scientific production (authors and editors), a citation analysis sheds light on the changing structure of the “back stage” of scholarly contributions published in *PS*.⁸

Familiarity with often-quoted sources in part determines the reader's identification with a journal. It leads to the development of social and intellectual boundaries between disciplines. One also speaks in this respect of the “geography” of the discussion forum of scientists. Figure 3 analyzes the origins of citations. This figure clearly indicates that the discussion forum for *PS* has been dominated by Dutch sources. While a study of trends in the field of Dutch psychology pointed to the rapidly diminishing relevance of

German sources and the steady increase of citations to English literature in the mid-twentieth century (Van Strien 1993: 158), the fairly parallel evolution of references to English and German publications until the mid-1960s in figure 3 is striking. The late breakthrough of references to English literature is probably related to the lasting influence of the Kantian, *geisteswissenschaftliche* tradition in educational science in the Low Countries. However, the rate of circulation of sources also significantly increased during this period. The books by prominent figures such as Kohnstamm and Langeveld survived relatively long. In the 1950s and 1960s a few books of foreign origin were frequently quoted, such as H. Schelsky's *Die skeptische Generation* (1957) and B. S. Bloom's *Taxonomy of Educational Objectives* (1956–64). However, such cornerstones remained exceptional in the Dutch building of educational science (see also De Solla Price 1963). Overall, it can again be underlined that *PS* remained mainly a Dutch journal; communication via *PS* was dominated by local information.

It is often said that the Dutch, wedged between English-, French-, and German-speaking great powers, are traditionally very internationally oriented. For Johan Huizinga, this was both a historical fact and a national virtue. Along the same lines, the Dutch philosopher of science Trudy Dehue (1995: 9) remarked about her countrymen, "They have always been aware of what is written in other countries, and academics in particular did not have to wait for Dutch translations of foreign-language materials." In other publications, the condition of the Dutch-language social and human sciences has been compared with that of an observer behind a one-way mirror. Dutch scientists register what is going on in other scientific communities, while their own activities remain unobserved by those on the other side of the screen (e.g., Heilbron 1988). The data presented in figure 3, however, indicate that the international orientation of the educational researchers, who published in the flagship journal of their national community, was rather limited until the mid-twentieth century.

In the preceding section evidence was presented regarding changes in editorial and authorial participation in scientific communication. It proved impossible to classify all or most of *PS* authors according to their nationalities or institutional affiliations, because biographical information and addresses were not provided in most of the journal's issues in the period before and shortly after World War II. Neither do there exist reliable lists with biographical data about all the researchers in the field of education

in that era. On the basis of the available evidence, however, it can be said that *PS* has hardly been able to attract an international authorship. Dutch authors clearly have dominated the journal and its scientific community. The available evidence indicates that even the participation of Flemish scholars was negligible until the 1960s. The scientific community was very much a national community; the rise of the discipline took place within national and linguistic boundaries. For a long period of time, the rise of scientific disciplines seemed to go along with a strengthening of national communities.

In connection with this theme, the last figure draws attention to changes in the kind of literature referred to in articles in *PS*. The genesis of the contemporary, standardized system of citations and references (in the style favored by the American Psychological Association) clearly did not follow a linear pattern in *PS*. Although bibliographies and lists of cited literature already existed in the 1920s, it was not until the 1960s that they became widely used (Leydesdorff 1998; Wouters 1999; Moed 2005; see also Gross et al. 2002: 161–86). Until then it was common to use footnotes or to omit references altogether. In 1959 an author could still write: “The following does not claim to be original. A lot is borrowed from other publications, but without reference” (Van der Ploeg 1959: 87). Even in the 1960s acknowledgment of sources was not yet obvious. “It goes for the whole article that the inclusion of references to other authors is impossible, as these notes would be more extensive than the article itself” (De Block 1966: 125). Finally, an almost complete standardization took place about 1970. Not completely by coincidence, it was also in 1970 that the style and the layout of *PS* changed. The journal got a “modern” look. In the meantime the number of references had drastically increased (to almost 10 times the number of 1946), with the most common reference being to Dutch publications.

Figure 4 offers an overview of the types of sources—books or journal publications—that were listed in bibliographies and footnotes. It is difficult to interpret these findings, while comparative-historical research on the evolution of different scientific disciplines in different national settings is hitherto hardly available (cf. Ellis 1989; Pontille 2003).⁹ The dominance of book publications, which is visible in figure 4, however, seems to ensue from the “applied” nature of educational science. The citation practices in *PS* reflect the intimate relation between the discipline and its field of practice. The journal paid a lot of attention to policy documents and governmental reports and books. Moreover, the increase of the number of refer-

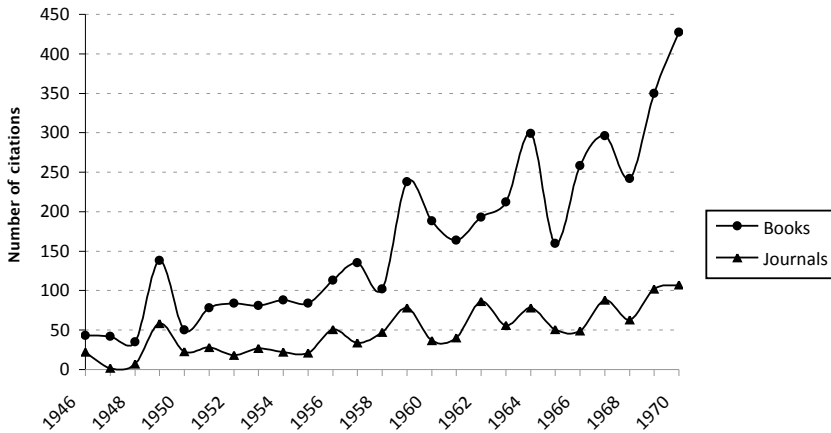


Figure 4 Citations from books and journals

ences to periodicals was not proportional to that of books. Even the number of “self-citations”—that is, citations to other publications in *PS*—remained remarkably low.¹⁰ Despite frequent positive reviews in *PS* of foreign periodicals, German and English journals continued to play a marginal role in the disciplinary communication in the Netherlands. Between 1920 and 1970 *PS* was primarily a journal that compiled and published information that was not readily available to its subscribers. It also stimulated critical reflection on prevailing educational policies. The role *PS* fulfilled in this period was mainly one of reporting and indicating developments in the field of education and educational science—as the many items with news about conferences (for scientists and for practitioners in the field of education) also demonstrates.

There can thus be no doubt that the purposes of *PS* have changed significantly during this period. For a long time the editorial board tried to disseminate findings of (inter)national research to researchers in the Netherlands and to offer its readers an overview of (inter)national developments in education. The board was itself largely responsible for writing the articles of *PS*. This kind of informative role gradually disappeared in the second part of the twentieth century. At present, the *raison d'être* of the journal is the presentation of new research findings and new insights. Its readership now consists of *potential authors* of journal articles who do not need a Dutch journal to learn about new, international developments in their field. The social expectations regarding scientific publishing have clearly changed.

As others have pointed out, there is a shift in the meaning of the term *discipline* in the modern era, namely, from an imperative to preserve the truth to an interest in the novelty of an invention.¹¹ In the early modern developments, the archival function of scientific disciplines still dominated. Only in the modern era did the discipline become an active system for the production of knowledge (see Rorty 1979: 131–39; Luhmann 1990; Stichweh 1994). The morphogenesis of scientific journals seems to have supported and accelerated this evolution. Much more than before, contemporary scientific disciplines are based on the ceaseless production of novelties. What is communicated might be a small particle of knowledge as long as it is a *new* particle of knowledge. As a *scientific* journal, *PS* also had to come to terms with this directive.

Concluding Remarks

Scientists are trained to critically observe their own and each other's work. But this critical energy is almost entirely directed toward the scientific production process, toward the “technical” aspects of research. The communication aspects are given much less attention. They are not perceived as historically specific forms that exert pressure on the research process and determine the conditions of participation in the disciplinary communication processes. There are, however, many ways the discipline might benefit from a more reflexive orientation toward its own patterns of communication (Bourdieu 2001: 128–41). These historically contingent formats not only define conditions of inclusion or exclusion in scholarly communication; evolutions in communication formats also have important consequences for the way scientific research is conducted and scientific disciplines are identified.

The preceding sections of this article focused on scholarly communication in the community of Dutch-speaking educational researchers. The graphs and table presented here indicate how its major specialized journal, *PS*, “organized” communication in the period 1920 to 1970 (or to 1975). In many other nations, similar journals with similar purposes were established during the twentieth century to enhance the intellectual exchange in their scientific communities. For the social sciences, disciplinary communication was indeed predominantly organized at the national level until well into the second half of the twentieth century. But what will remain of the different national traditions in our “global age”? My final comments address this issue.

In certain respects, the dynamics of discipline formation and specializa-

tion nowadays lead *again* to global networks of science. In the early modern era, science mostly was conceived of as universal or global science. Often its findings and observations were communicated in Latin, the lingua franca of early modern science. The nineteenth- and twentieth-century “nationalization” of science then constitutes but an intermediate phase in the evolution of the world system of science (Stichweh 1994; Abbott 1999).

The national setting might have been a meaningful restriction of communication space in emerging and newly constituted networks. Although this nationalization limited the communicative space of disciplines, it can be argued that it enabled an increase in the participation in scientific communication. Within national communities, more researchers and research groups gained the opportunity to participate actively in scientific communication. The emergence of forms of multiple authorship also points to an underlying expansive logic. Researchers increasingly have become able to participate in authorial roles on the basis of very small contributions of their own. Against this background, it is probably no coincidence that the communicative relevance of the national level is currently called into question. The expansion of the participation in scientific communication has made it much easier to give greater priority to fairly selective global communication media, such as peer-reviewed and citation-indexed journals.

The ongoing dynamics of specialization and disciplinary differentiation seems another reason why some national settings at present no longer provide sufficient opportunities for communication for a rapidly growing number of disciplines and subdisciplines. At least some national communication networks now no longer seem to provide a sufficient infrastructure (Crawford et al. 1993; Drori et al. 2003: 280–92). Professional associations and education journals with a “regional” or global focus have expanded rapidly in recent years—among them several European associations and journals (the *European Journal of Education*, the *European Educational Research Journal*, the *European Journal of Teacher Education*, *Higher Education in Europe*, etc.). Also, several national—especially English-language—journals have become global ones (measured by the compositions of their editorial boards, the nationalities of their authors and subscribers, or their impact factors). Semiperipheral scientific communities, such as the Dutch-language one, now need to come to terms with these changes and operate in an increasingly English-dominated, transnational scientific community.

Globalization is one of the main challenges with which scientific com-

munities are confronted too. But what will become of the national scientific community? It would be unjustified to argue that the national level will soon become (or already is) a nonexistent entity in the “world” of science. In a range of respects, the social relevance of the national level has probably been augmented in recent times. The dependence of scientific research on state finance has not decreased since World War II, while governments have also searched for new ways to increase their influence on the academic world. However, we may predict that the increasingly global networks of scientific collaboration and communication will soon make it difficult to discern distinctive national traditions in particular (sub)disciplines, such as education.

Notes

- 1 For the history of the scientific journals, see Smith 1972; Kronick 1976; McKie 1979; Manten 1980a; Bazerman 1988; Atkinson 1999; and Gross et al. 2002. For a recent review of the literature on knowledge production and scholarly communication in the early modern and modern eras, see Bazerman and Rogers 2008.
- 2 Around 1900 several Dutch-language educational journals with scientific pretensions were founded, such as the *Nieuw Tijdschrift ter Bevordering van de Studie der Paedagogiek* (*New Journal for the Advancement of the Study of Education*, 1890–1908), *Oud en Nieuw* (*Old and New*, 1896–1902), *Nieuwe Paedagogische Bijdragen* (*New Pedagogical Contributions*, 1901–6), and *Kinderstudies* (*Child Studies*, 1916–22). But these journals served as the mouthpieces of the interests prevailing in particular teacher organizations, research institutes, or religious groups. For various reasons (lack of subscriptions, lack of contributions, conflicts among board members), all of them also soon disappeared.
- 3 I did, however, also examine more closely several individual instances, such as the editorials of all single issues of *PS*. Moreover, I had access to the archives of the journal for the period 1920–57. I here only minimally draw on this qualitative material; it is difficult to quote Dutch material in an article that aims to address an English-reading audience. But some of the choices made in the presentation of the quantitative material are informed by it.
- 4 The rise of competing Dutch educational periodicals created alternative publication outlets for Dutch-speaking researchers. Important here is first of all the founding, from the early 1960s on, of a number of specialist subdisciplinary journals focusing on special education, school instruction, adult education, educational policy and law, and so on. A few new generalist Dutch-language journals were founded too, among them the *Pedagogisch Tijdschrift* (*Journal of Pedagogy*, founded in 1976), *Comenius* (founded in 1980), and the *Nederlands Tijdschrift voor Opvoeding, Vorming en Onderwijs* (*Dutch Journal of Education, Civilization, and Instruction*, founded in 1985). Many of these publications have disappeared, mainly because of falling submissions

and subscriptions during the last decades. While their existence clearly affected *PS*, *PS* itself may reasonably be taken to have a special significance for the morphogenesis of Dutch educational science, if only because of its longevity.

- 5 We do not know the number of academics who could have contributed to the journal. There is no available list of individuals who might have published in *PS*. There exist lists of teaching staff employed by Belgian and Dutch universities, but reliable biographical data about all the researchers in the field of education do not exist. Preliminary comparisons with Dutch-language sociology journals, however, indicate that the changing role of *PS*'s editorial board is highly remarkable. In the sociology journals, the editors played a much less visible role already in the first half of the previous century. At present I can only point to these differences. For explanations, more comparative research will be needed.
- 6 These percentages decrease drastically when the period after 1970 is taken into account. However, the dominance of a small number of authors was even greater in the prewar period. Between 1920 and 1941 three highly productive writers—Gunning (47), P. Diels (47), and Kohnstamm (59)—wrote 24.2 percent of all the articles, and the “top 10” wrote 41.5 percent of the total. Such proportions are not unique to educational science in the Netherlands. J. Baumert and P. M. Roeder (1990) point to highly similar proportions and evolutions in the disciplines of physics and education in Germany (see also Hofstetter and Schneuwly 2001).
- 7 Alternatively, it can be argued that scientific disciplines have to rely on delimited groups of people who join together on the basis of common interests or motives, especially within the frame of conferences, study groups, professional associations, or scholarly societies. Jennifer Platt (1998, 2003) has followed this line of research in studies on the history of sociology.
- 8 Of course, citations can be used for many reasons: giving credit for related work, criticizing previous work, substantiating claims, providing background reading, and so on. Moreover, citation does not necessarily indicate use. For the purposes of this article, it is not necessary to explore the motives of individual authors (cf. Camic 1992). My aim is to analyze the evolving structure of the disciplinary communication, as this social structure determines and is determined by individual motives for citing or not citing particular work (Bourdieu 2001; see also Weinstock 1971; Renaar and Palmer 2009).
- 9 There do exist different academic and disciplinary cultures in science. Publication practices are not uniform across disciplines, and neither are citation practices. For example, unlike researchers in the natural sciences, medicine, and technology, social scientists and humanities scholars still tend to publish extensively in books and target national audiences in their own languages. Many objections against contemporary attempts to measure scientific productivity on the basis of publications in so-called top journals build on such observations. But we do not just need warnings about the “danger” of contemporary metrics (e.g., Andersen et al. 2009); we also need detailed historical studies of the specifics of different publishing cultures and the evolution in the social appreciation of what constitutes “great research.”

- 10 *Self in self-citations* thus refers to the journal *PS* itself, to work published in the same outlet. The more common understanding of *self-citation*, namely, an instance of an author citing his or her own work, has not been used in this analysis.
- 11 Etymologically, the term *discipline* is derived from the Latin *discere* (learning); *disciplina* has long been used as a term for the ordering of knowledge for the purposes of instruction in schools and universities. The term *disciplina* also included implications such as admonition, correction, and even punishment for mistakes (Foucault 1984).

References

- Aaltojärvi, I., I. Arminen, O. Auranen, and H.-M. Pasanen (2008) "Scientific productivity, Web visibility, and citation patterns in sixteen Nordic sociology departments." *Acta Sociologica* 51: 5–22.
- Abbott, A. (1999) *Department and Discipline: Chicago Sociology at One Hundred*. Chicago: University of Chicago Press.
- Andersen, A., et al. (2009) "Journals under threat: A joint response from history of science, technology, and medicine editors." *Journal of the History of the Behavioral Sciences* 45: 2–4.
- Atkinson, D. (1999) *Scientific Discourse in Sociohistorical Context: The Philosophical Transactions of the Royal Society of London, 1675–1975*. Mahwah, NJ: Erlbaum.
- Baumert, J., and P. M. Roeder (1990) "Forschungsproduktivität und ihre institutionellen Bedingungen—alltag erziehungswissenschaftlicher Forschung." *Zeitschrift für Pädagogik* 36: 73–97.
- Bazerman, C. (1988) *Shaping Written Knowledge: The Genre and Activity of the Experimental Article in Science*. Madison: University of Wisconsin Press.
- Bazerman, C., and P. Rogers (2008) "Writing and secular knowledge within modern European institutions," in C. Bazerman (ed.) *Handbook of Research on Writing*. Mahwah, NJ: Erlbaum: 157–75.
- Bloom, B. S., ed. (1956–64) *Taxonomy of Educational Objectives*. 2 vols. New York: Longman and McKay.
- Bornmann, L. (2007) "Peer-Review in der Wissenschaft—eine Analyse des Begutachtungsverfahrens aus der Sicht wissenschaftssoziologischer Theorien." *Swiss Journal of Sociology* 33: 327–47.
- Bourdieu, P. (2001) *Science de la science et réflexivité: Cours du Collège de France, 2000–2001*. Paris: Raisons d'Agir.
- Brown, C. (2001) "The e-volution of preprints in the scholarly communication of physicists and astronomers." *Journal of the American Society for Information Science and Technology* 52: 187–200.
- Camic, C. (1992) "Reputation and predecessor selection." *American Sociological Review* 57: 421–45.
- Coser, L. A. (1965) *Men of Ideas: A Sociologist's View*. New York: Free Press.

- Crawford, E., T. Shinn, and S. Sörlin (1993) *Denationalizing Science: The Contexts of International Scientific Practice*. Dordrecht: Kluwer.
- Cronin, B. (1984) *The Citation Process: The Role and Significance of Citations in Scientific Communication*. Los Angeles: Taylor Graham.
- De Block, A. (1966) "Opvoeding, vorming en onderwijs." *Paedagogische Studiën* 43: 120–28.
- De Solla Price, D. J. (1963) *Little Science, Big Science*. New York: Columbia University Press.
- Deen, N., and E. Velema (1974) "Verantwoording." *Paedagogische Studiën* 51: 47–48.
- Deheu, T. (1995) *Changing the Rules: Psychology in the Netherlands, 1900–1985*. Cambridge: Cambridge University Press.
- Depaape, M., and N. Bakker (1998) "Een gemeenschappelijke studeerkamer: 75 jaar *Paedagogische Studiën*." *Paedagogische Studiën* 75: 9–44.
- Drori, G. S., J. W. Meyer, F. O. Ramirez, and E. Schofer (2003) *Science in the Modern World Polity: Institutionalization and Globalization*. Stanford, CA: Stanford University Press.
- Eisenstein, E. (1979) *The Printing Press as an Agent of Change*. Cambridge: Cambridge University Press.
- Ellis, D. (1989) "A behavioural approach to information retrieval system design." *Journal of Documentation* 45: 171–212.
- Foucault, M. (1984) *Surveiller et punir: Naissance de la prison*. Paris: Gallimard.
- (1995) "Qu'est-ce qu'un auteur?" in *Dits et écrits*, vol. 1. Paris: Gallimard: 789–821.
- Frickel, S., and N. Gross (2005). "A general theory of intellectual/scientific movements." *American Sociological Review* 70: 204–32.
- Garfield, E. (1985) *The Awards of Science and Other Essays*. Philadelphia: Intercollegiate Studies Institute Press.
- Geiger, R. L. (2004) *To Advance Knowledge: The Growth of American Research Universities, 1900–1940*. New York: Oxford University Press.
- Gieryn, T. F. (1999) *Cultural Boundaries of Science: Credibility on the Line*. Chicago: University of Chicago Press.
- Gross, A. G., J. E. Harmon, and M. Reidy (2002) *Communicating Science: The Scientific Article from the Seventeenth Century to the Present*. Oxford: Oxford University Press.
- Haas, C. (1996) *Writing Technology: Studies on the Materiality of Literacy*. Mahwah, NJ: Erlbaum.
- Heilbron, J. (1988) "Particularités et particularismes de la sociologie aux Pays-Bas." *Actes de la recherche en sciences sociales* 14: 76–81.
- Heilbron, J., N. Guilhot, and L. Jeanpierre (2008) "Toward a transnational history of the social sciences." *Journal of the History of the Behavioral Sciences* 44: 146–60.
- Hirschauer, S. (2004) "Peer-Review Verfahren auf dem Prüfstand." *Zeitschrift für Soziologie* 33: 62–83.

- Hofstetter, R., and B. Schneuwly (2001) *Educational Science in Switzerland: Evolution and Outlooks*. Bern: Cest.
- Horn, K.-P. (2003) *Erziehungswissenschaft in Deutschland im 20. Jahrhundert*. Bad Heilbrunn: Klinkhardt.
- Jonker, A. E. M. (1988) "Pedagogische Studiën 1920–1970." *Pedagogische Studiën* 65: 502–13.
- Keiner, E. (1999) *Erziehungswissenschaft, 1947–1990: Eine empirische und vergleichende Untersuchung zur kommunikativen Praxis einer Disziplin*. Weinheim: Deutscher Studien Verlag.
- Kronick, D. A. (1976) *A History of Scientific and Technical Periodicals: The Origins and Development of the Scientific and Technical Press, 1665–1790*. Metuchen, NJ: Scarecrow.
- Kuhn, T. S. (1970) *The Structure of Scientific Revolutions*. 2nd ed. Chicago: University of Chicago Press.
- Lamont, M., and V. Molnár (2002) "The study of boundaries in the social sciences." *Annual Review of Sociology* 28: 167–95.
- Lenoir, T. (1997) *Instituting Science: The Cultural Production of Scientific Disciplines*. Stanford, CA: Stanford University Press.
- Leydesdorff, L. (1998) "Theories of citation?" *Scientometrics* 43: 5–25.
- (2001) *The Challenge of Scientometrics: The Development, Measurement, and Self-Organization of Scientific Communications*. Leiden: DSWO.
- Luhmann, N. (1990) *Die Wissenschaft der Gesellschaft*. Frankfurt am Main: Suhrkamp.
- Manten, A. A. (1980a) "The growth of European scientific journal publishing before 1850," in A. J. Meadows (ed.) *Development of Science Publishing in Europe*. Amsterdam: Elsevier: 1–22.
- (1980b) "Publication of scientific information is not identical with communication." *Scientometrics* 2: 303–8.
- McKie, D. (1979) "The scientific periodical from 1665 to 1798," in A. J. Meadows (ed.) *The Scientific Journal*. London: Aslib: 7–17.
- Merton, R. K. (1968) *Social Theory and Social Structure*. Glencoe, IL: Free Press.
- Moed, H. F. (2005) *Citation Analysis in Research Evaluation*. New York: Springer.
- Noordam, N. F. (1961) "Veertig jaar *Paedagogische Studiën*." *Paedagogische Studiën* 38: 273–76.
- Platt, J. (1998) *A Brief History of the ISA, 1948–1997*. Quebec: International Sociological Association.
- (2003) *The British Sociological Association: A Sociological History*. Durham: Sociologypress.
- Pontille, D. (2003) "Authorship practices and institutional contexts in sociology: Elements for a comparison of the United States and France." *Science, Technology, and Human Values* 28: 217–43.
- Reill, P. H. (1998) "The construction of the social sciences in late eighteenth and early nineteenth century Germany," in J. Heilbron, L. Magnusson, and B. Wittrock

- (eds.) *The Rise of the Social Sciences and the Formation of Modernity*. Dordrecht: Kluwer: 107–40.
- Renear, A. H., and C. L. Palmer (2009) “Strategic reading, ontologies, and the future of scientific publishing.” *Science*, no. 325: 828–32.
- Rorty, R. (1979) *Philosophy and the Mirror of Nature*. Princeton, NJ: Princeton University Press.
- Russell, D. R. (1991) *Writing in the Academic Disciplines, 1870–1990*. Carbondale: Southern Illinois University Press.
- Schelsky, H. (1957) *Die skeptische Generation*. Düsseldorf: Diederichs.
- Smith, A. G. R. (1972) *Science and Society in the Sixteenth and Seventeenth Centuries*. London: Thames and Hudson.
- Stichweh, R. (1994) *Wissenschaft, Universität, Professionen: Soziologische Analysen*. Frankfurt am Main: Suhrkamp.
- Tenorth, H.-E. (1989) “Deutsche Erziehungswissenschaft im frühen 20. Jahrhundert: Aspekte ihrer historisch-sozialen Konstitution,” in P. Zedler and E. König (eds.) *Rekonstruktionen pädagogischer Wissenschaftsgeschichte: Fallstudien, Ansätze, Perspektiven*. Weinheim: Beltz: 117–40.
- Titze, H. (1995) *Wachstum und Differenzierung der deutschen Universitäten, 1830–1945*. Göttingen: Vandenhoeck und Ruprecht.
- Van der Ploeg, J. G. (1959) “Vorming in de strijdkrachten.” *Paedagogische Studiën* 36: 78–87.
- Van Strien, P. (1993) *Nederlandse psychologen en hun publiek*. Assen: van Gorcum.
- Vanderstraeten, R., and I. van Hilvoorde (2001) “Evolutielijnen van de wetenschappelijke pedagogiek: Disciplinegrenzen, tijdschriftpublicaties en *Paedagogische Studiën*.” *Paedagogische Studiën* 78: 36–55.
- Weinstock, M. (1971) “Citation indexes,” in A. Kent and H. Lancour (eds.) *Encyclopedia of Library and Information Science*. New York: Dekker: 16–40.
- Wouters, P. F. (1999) “The citation culture.” PhD diss., Universiteit van Amsterdam.
- Zwart, H. (2001) *De wetenschapper als auteur*. Nijmegen: SUN.