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Communication patterns in educational science: an analysis of scientific journal publishing in the Netherlands

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Abstract

In the modern scientific disciplines, scholarly journals fulfil a key role. 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 background, I analyse in this paper the evolution of the leading scholarly journal in the field of education in the Netherlands, viz. *Paedagogische Studiën* [Studies in Education]. I pay particular attention to the changing role of the editorial board of the journal, and to the use of citations in this journal in the period 1920–1975. Because of the close relationship between journal and discipline, this analysis highlights basic characteristics of the patterns of communication in educational science in the Netherlands.

1 Introduction

In recent years, research into the social characteristics of science has taken an empirical and constructivist turn. The classical types of reflections on the institutional and normative embedding of science are being replaced by empirical research that focuses on how scientific knowledge is actually manufactured and shared with the wider scientific community. An important issue which has been brought to the fore in this context concerns the structure and evolution of scientific communication. As some authors have clarified, this issue provides a strong impetus for the analysis of scientific journal publishing. Communication in a scientific community is to a considerable extent dependent on journal publications. Analyses of the evolution of particular aspects of scientific journal publishing might therefore add to our understanding of the construction of the social identity of scientific disciplines (Stichweh, 1984, 1994; Abbott, 1999, 2001; Knorr-Cetina, 2000).

This article presents a case-study which focuses on the evolution of scholarly publishing in education in the Netherlands. As in a number of other countries, the institutionalisation of educational science in the Netherlands took place in the course of the 20th century. Often the discipline's official start in the Netherlands is situated on February 3 of the year 1900, when the first lecturer in education (J. H. Gunning)

delivered his inaugural address at the University of Utrecht. But it is not the determination of a point zero that is currently of interest. On the basis of an analysis of the journal *Paedagogische Studiën* [Studies in Education, henceforth *PS*], I aim to examine the changing structure of communication in this discipline. The journal *PS* lends itself very well to this kind of research (Jonker, 1988; Depaepe & Bakker, 1998). Founded immediately after the First World War, it is the first central disciplinary journal in the field of education with forthright scientific pretensions. Between the 1920s and 1970s, the journal has continued to play the leading role in the field. It has covered a broad range of topics characteristic of the field of education, and has continued uninterrupted periodic publication for several decades.¹ On the basis of an analysis of the journal *PS* in the period 1920–1970, it is in my view possible to analyse the changing patterns of communication in this discipline in the Netherlands.

My purpose is to highlight and analyse the role played by specialized journals in the formation of academic fields of study. Such journals carry, channel, and give shape to the fields' communicative processes. They do so in ways that have far-reaching consequences for the social recognition of relevant topics, legitimate issues, and methodological standards. Educational science in the Netherlands is a field particularly suitable for our purposes. The Dutch, wedged in between English-, French-, and German-speaking great powers, are traditionally very internationally oriented. As the Dutch philosopher of science Dehue (1995, p. 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". Perhaps it can be argued that the Netherlands offers a miniature image of global (Western) developments in communication patterns in educational science. In the next section, I briefly explain the core theoretical notions that underpin my approach. Afterwards, I present and discuss statistical data that visualize the evolutions that have taken place in the communicative structures of Dutch studies in education. In the concluding section, I briefly summarize the findings and point to some implications with regard to the authorship of publications.

2 Disciplines as communication systems

From the 19th century onwards, the university has become 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. The unquestionable relationship between the growth of the university, on the one hand, and of scientific research, on the other, has led several researchers to conceive the social history of science in terms of the history of chairs and professorships at universities or research institutes (e.g. Titze, 1995; Otto, Rauschenbach & Vogel, 2002). However, these institutes are *not* the locations where research findings are communicated, published and evaluated. The communication of research findings takes place in another context, namely, a disciplinary context. Research findings are communicated in encyclopaedias and books, or at conferences, seminars and workshops. But most of all, the scholarly journal has become the instrument that allows for the self-organization of the disciplines. Publications in a scholarly journal (articles, review essays, rejoinders, etc.)

have become the basic communicative units in the discipline (Stichweh, 1994, pp. 52–83). They generate and reproduce the disciplinary communication process. Each publication interacts with preceding ones, by incorporating into its own line of reasoning arguments developed in other publications; and each new publication, due to the claims it makes to new knowledge, invites reactions and hence further publications.

It is important to note that scholarly journals not only enable the communication of research findings, but also influence how contributions to scientific communication can be made.² In comparison with the production and circulation of books, periodicals lead to the *rapid* succession of *small* contributions. Publications in periodicals follow on each other at short and regular intervals. Furthermore, the scientific review is likely to visualize the theoretical and methodological variability of a (sub)discipline, as it consists of a collection of different articles by different authors. It can be expected that the diversity of published contributions induces a reflection upon the relationship between (and coherence of) these contributions. 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 which are different 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. Seen against this background, the idea seems to suggest itself to analyse scholarly journals with regard to discerning the very constitution of scientific disciplines as they have developed in the past decades (Tenorth, 1990; Keiner, 1999).

Periodicals influence the temporal structure of the system 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. At the same time, 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 upon publication behaviour. Discussions about what is, and what is not, a valid publication are age-old (Manten, 1980b). The current peer review system puts up a barrier, but grants at the same time a minimal form of recognition or credit to published research findings. It endorses what the scientific community takes to be certified knowledge (Garfield, 1985). 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. One may therefore conclude that the scholarly journals play a prominent role in the formation of scientific disciplines. The analysis of the foundation and evolution of a scholarly journal allows to examine the evolution of a (sub)discipline, as well as the specific position of the journal in the field of study.

The weight I give to scholarly journals may be somewhat surprising. As I have indicated, disciplines would scarcely be able to survive without the support of institutions – be these universities, academies, research institutes, or any other form of organizational infrastructure – since they guarantee the continuity of academic work by providing occupational roles, social status, and publication facilities. Scientific disciplines, in addition, 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 (Horn, 2003). I do not doubt that overviews of this ‘infrastructure’ are helpful in order to understand the evolution of the system of science, and of particular disciplines. But if one conceives of scientific disciplines as self-organizing networks of communication, then it becomes necessary to analyse how the flow of a disciplinary communication process is generated, continued, and reproduced. I have indicated that publications stand for the continuity of a discipline’s communication process, and that specialized journals are media of publication par excellence. There are good reasons, therefore, to analyse specialized journals in order to discern the distinctively patterned networks of communication that characterize scientific disciplines.

3 Educational science in the Netherlands

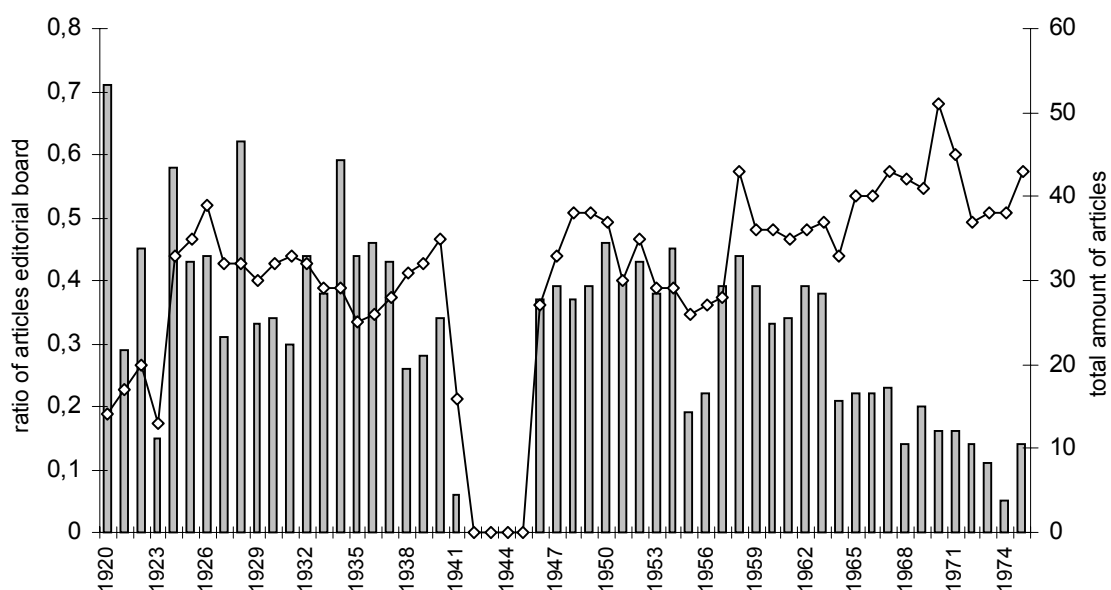
How does one proceed with such an analysis? In the introduction of his excellent study on the history of the *American Journal of Sociology* (founded in 1895), Andrew Abbott remarks: “I was plowing what seemed virgin soil; there was almost no serious historical investigation of the institutional structures of modern scholarly publication” (1999, pp. ix-x; see also Abbott, 2001, pp. 91–120; Platt, 2002). In contrast to past empirical studies of scholarly journals which have mostly focused on the effects of an author’s rank, method, gender or institutional affiliation on the publication of particular articles in particular journals (cf. Hammermesh, 1994; Hirschauer, 2004), I try to discern the constitution of scholarly communication in the field of education as it has developed in the Netherlands. My predominantly quantitative analyses of the following subsections focus on the changing role of the editorial board of *PS* and on the uses or citations of publications in journal articles in the period between 1920 and 1970 (or 1975, if this provides a better picture of a particular trend).³ It is not possible to provide a simple explanation of every trend, but taken together, these data elucidate the changing role of the central disciplinary journal in the changing communication system of educational science in the Low Countries.

3.1 Authors and editors

From the onset, *PS* conceived itself as a scholarly journal.⁴ Most of the founding editors held research positions at Dutch universities. The board has always been chaired by noted academics: J. H. Gunning (1919–1938), Ph. Kohnstamm (1938–951), I. C. van Houte (1952), H. Nieuwenhuis (1953–1957), Ph. Idenburg (1958–1972). At the end of the 1960s, the increasing specialization of research and the increasing impact of hypothesis-testing and empirical-analytical thinking left their mark on the landscape of scholarly journals in the Low Countries. The broad, generalist character of *PS* was subjected to great pressure (cf. *PS* 1988, pp. 502–513; *PS* 1998, no. 6, pp. 9–44). In 1970, the journal slightly changed the spelling of its name – from the ‘archaic’ *Paedagogische Studiën* to the ‘modern’ *Pedagogische Studiën*. In this period, it also started to narrow its focus both substantively and methodologically, specializing in (quasi-)experimental articles on school psychology. For this reason, the following analyses are based on publications in the period until 1970.

To highlight particular processes of scholarly production, figure 1 focuses on the role of the editorial board of *PS* in the period 1920–1975. This figure displays the proportion of articles in *PS* which 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 ten 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 the Second World War. This evolution has to do with the fact that an increasing number of authors became less loyal to *PS* and wanted to publish in several journals. The rise of competing Dutch periodicals and the growing internationalisation of educational science in the Netherlands contributed to this trend. Moreover, publication in *PS* became less important to the editors' own academic progress. The number of full professors on the editorial board of *PS* increased steadily (in 1936, 22 %; in 1946, 38 %; in 1956, 44 %; in 1966, 59 %; in 1976, 63 %; in 1986, 70 %). 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 editorial 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 (cf. Gieryn, 1999).

Figure 1: The productivity of the editorial board



To complement the preceding analysis, table 1 provides an overview of the distribution of publications in *PS*. My starting point was the following question: Does a select group write most articles or is the majority written by a large group of authors who publish only once or twice in *PS*? The first column of this table lists the number of articles written by individual authors; the second column lists the corresponding number of authors. Column 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 amount of articles (in absolute numbers and percentages respectively). For example, there are two authors (0,3 %) who published 25 articles in the period 1920–1970 (P. L. van Eck and G. van Veen); 98,6 % of the authors published fewer than 25 articles each, but as a group only contributed 75,4 % of the total number of articles published in *PS* (in absolute numbers: 1169 out of 1550 articles).

Table 1: The productivity of authors

articles	authors	%	cum. %		total	cum. %
					articles	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		1012	65,3
12	2	0,3	97,4		1036	66,8
14	1	0,2	97,6		1050	67,7
15	2	0,3	97,9	Brugmans*; Siewertsz van Reesema	1080	69,7
16	1	0,2	98,1	L. van Gelder*	1096	70,7
23	1	0,2	98,3	Ph. Idenburg*	1119	72,2
25	2	0,3	98,6	P. L. van Eck; G. van Veen*	1169	75,4
26	1	0,2	98,8	H. Nieuwenhuis*	1195	77,1
27	1	0,2	99,0	H. Stellwag*	1222	78,8
37	1	0,2	99,1	P. Post*	1259	81,2
47	1	0,2	99,3	P. Diels*	1306	84,3
48	1	0,2	99,5	J. H. Gunning*	1354	87,3
60	1	0,2	99,7	I. van der Velde*	1414	91,2
63	1	0,2	99,8	M. J. Langeveld*	1477	95,3
73	1	0,2	100	Ph. Kohnstamm*	1550	100
Total	584	100%				

Note: An asterisk identifies the editors among the most productive authors.

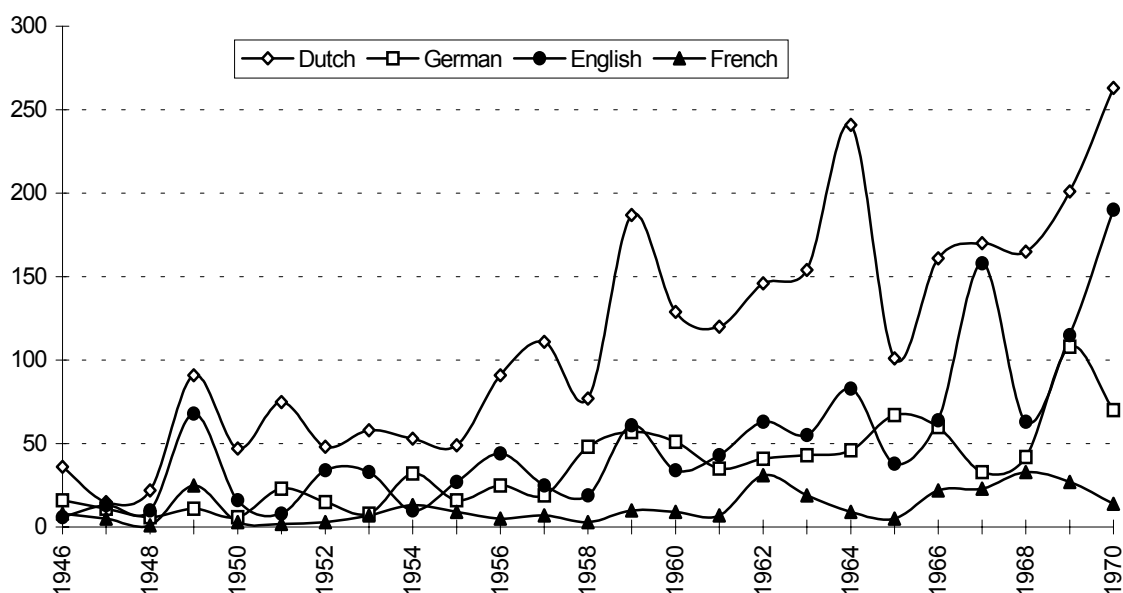
Table 1 shows that 64,4 % of the authors published only one article in *PS* between 1920 and 1970. On the other hand, 10 % of the authors wrote more than half of the total amount of contributions. The eight most productive authors – all of whom were important members of the editorial board – together published almost 25 % of all arti-

cles. The top three (van der Velde, Langeveld and Kohnstamm) were responsible for 12,6 % of all articles. In this period, *PS* is thus characterized by an oligarchic pattern of scientific communication.⁵ Until the end of the Second World War, a limited number of individual editors and authors unmistakably left their mark on *PS* and on educational research in the Netherlands. But from the 1960s onwards, the discipline and the journal became less dependent on dominant figures (with their particular individual interests). Instead, the work of a larger scientific community came to the fore in the journal. The organization of scientific communication increasingly took place by means of journal publications.

3.2 Publications and citations in *PS*

I have indicated that the communicative network of a discipline consists of publications that do (or do not) refer to each other. These references to other publications reveal the collective character of the scientific practice; the identity of a discipline can be established by way of citations. New findings are linked back to already published results (albeit often in a chaotic way). It is this structure that makes publications elementary units of the system of science (Stichweh, 1994, pp. 52–83; cf. Vanderstraeten, 2000). Conversely, citation analysis provides insight into the communication structure of a discipline or a scientific periodical. I have made both a quantitative and a content analysis of *PS* between 1920–1970. 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? Is there an evolution in the use of German and English publications (as has been observed with regard to the evolution of psychology in the Netherlands)?

Figure 2: Language of citations



Familiarity with often-quoted sources in part determines the readership's identification with a journal. It leads to the development of social and intellectual boundaries be-

tween disciplines. One also speaks in this respect of the ‘geography’ of the discussion forum of scientists. Figure 2 analyses the origins of citations. This figure clearly indicates that the discussion forum for *PS* has been dominated by Dutch sources. In comparison with trends in the field of psychology, the fairly parallel evolution of references to English and German publications until the midst of the 1960s is striking (van Strien, 1993, p. 158). The late breakthrough of references to English literature is probably related to the lasting influence of the ‘geisteswissenschaftliche’ tradition in education. On the other hand, the ‘rate of circulation’ of sources significantly increased in the course of this period. The books of dominant figures such as Kohnstamm and Langeveld did survive relatively long. In the 1950s and 1960s, a few books of foreign origin were frequently quoted, such as Schelsky’s *Die skeptische Generation* (1957) and Bloom’s *Taxonomy of Educational Objectives* (1956/1964). However, such cornerstones remained exceptional in the building of educational science (cf. De Solla Price, 1963; Merton, 1988).

The genesis of the contemporary, standardized system of citations and references (APA-style) 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). 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” (*PS* 1959, p. 87). Even in the 1960s, acknowledgement 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” (*PS* 1966, p. 125). Finally, an almost complete standardization took place around 1969/1970. 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 ten times the number of 1946), with the most common reference being to Dutch publications.

Figure 3: Citations from books and journals

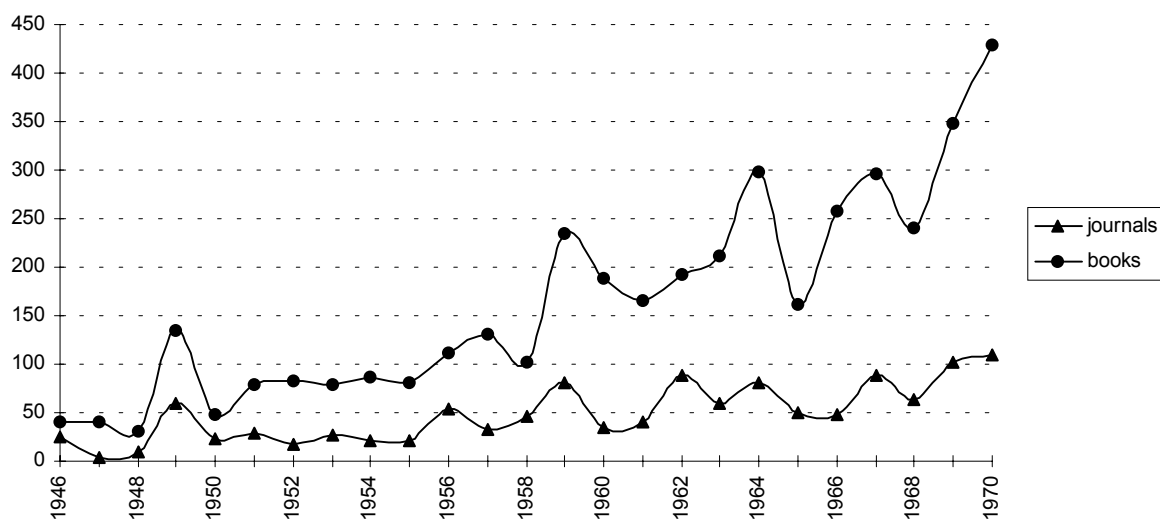
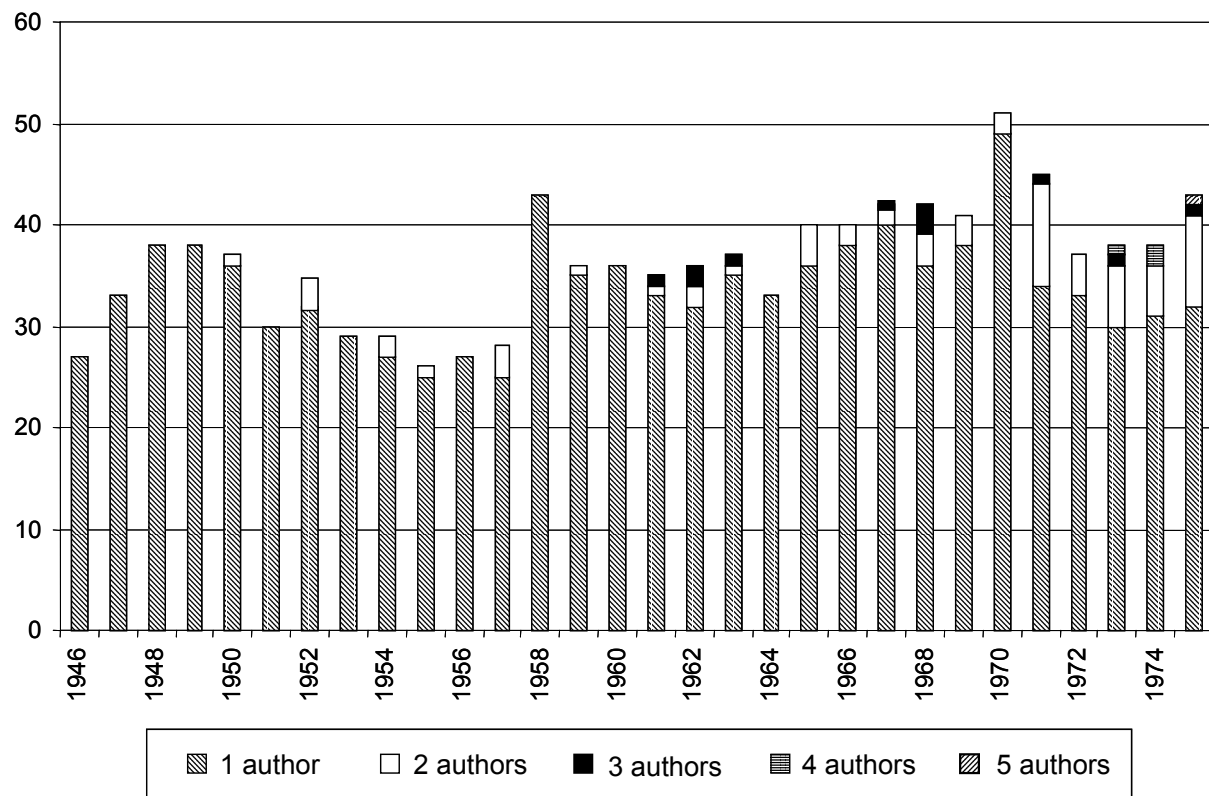


Figure 3 offers an overview of the type of sources – books or journal publications – that were listed in bibliographies and footnotes. The category ‘books’ also includes governmental reports. The remarkable dominance of ‘book’ publications is a consequence of the profile of *PS*. The journal used to pay a lot of attention to contemporary issues and policy documents. The increase of the number of references to periodicals was not proportionate to that of books. Even the number of ‘self-citations’ – that is, citations to other publications in *PS* – remained remarkably low. 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 which 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 high amount of announcements and reports of conferences also demonstrates).

Figure 4: Number of authors per article



Finally, figure 4 displays the evolution of the number of authors or co-authors per published article. Before 1941, a publication with more than one author was exceptional. There is, on the average, not more than one co-authored contribution per annual in this period. Afterwards, the authorship of publications is increasingly shared with one or even more colleagues. Besides well-known strategic considerations, research-intrinsic developments also influenced this evolution – as empirical research is often carried out

in teams. This evolution is, of course, not solely a Dutch phenomenon. The similarity to authorship trends in German periodicals (especially the *Zeitschrift für Pädagogik*) is remarkable (Keiner, 2002). Compared to developments in the field of scientific psychology, however, this evolution occurred relatively late (i.e. not in the fifties but only at the end of the sixties). As indicated, the analysis of citations pointed to a somewhat similar time lag. German researchers refer to this as the ‘scientific retardation’ of the discipline of education (Tenorth, 1989; Keiner, 2002).

4 Concluding remarks

From the 19th century onwards, it makes sense to describe scientific communities as communication networks that heavily rely on specialized journals for their own generation, continuation, and reproduction. The scientific journals represent the communicative form by which, at the macro-level of the system of science, communication complexes specialized along disciplinary lines can be bound together and persist in the long run. Moreover, the scientific publication affects the way research is conducted; it interferes in the scientific ‘production process’. In a kind of feedback loop, publications exercise pressure on the scientific production process, and thus contribute to the integration and identity of scientific disciplines.

In the first decades of the 20th century, the field of education in the Netherlands was dominated by the generation of its academic founding fathers. After the Second World War, it gradually became clear that the field could no longer identify itself with certain prominent figure-heads (with their idiosyncratic interests). An increasing number of researchers started to contribute to scholarly discussions. In this context, publications in educational journals came to play a prominent role in the development of disciplinary communication structures. The figures and tables presented in this article indicate how the major specialized journal in the Netherlands, *Paedagogische Studien*, has fulfilled its role in the period 1920–1970 (1975).

There is no doubt that the purposes of this journal have significantly changed in the course of this period. For a long period of time, the editorial board tried to disseminate findings of international research to researchers in the Netherlands, and to offer its readers an overview of national and international developments in education. The board was itself largely responsible for writing the articles of *PS*. This kind of informative role has gradually disappeared in the second part of the 20th 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). It is an important indication of the fact that the history of science is characterized by a shift of the meaning of ‘discipline’, namely, from an imperative to preserve the truth to an interest in the novelty of an invention.⁶ What is communicated might be a small particle of knowledge, as long as it is a *new* particle of knowledge. A contemporary discipline, such as education, is based on the incessant production of novelties.

In the second part of the article, I have also pointed to an increase in co-authorship of articles. For *PS*, this trend began in the 1960s. The indexes of recent volumes of this

journal (and of many other scholarly journals too) abundantly illustrate that this trend has become more outspoken during the last decades. Moreover, the current rise of ‘virtual’ journals tends to reinforce this trend. In fields such as physics, biology, mathematics, or information sciences, scholarly articles written by only one author have become highly exceptional (Zwart, 2001, pp. 26–29). The increase in co-authorship goes hand in hand with the further standardization of the methodology, terminology, and composition which are used in scholarly publications. In line with Michel Foucault (1995, pp. 789–809), we might therefore speak of the ‘disappearance’ and ‘effacement’ of the author; the ‘subjectivity’ of the author tends to get lost in specialized scholarly publications. Perhaps it is one of the contradictions of the postmodern society that publications in scholarly journals have in recent years at the same time become *more* important for purposes of evaluating individual researchers and research groups.

The evolutions in the field of education in the Netherlands could not have taken place without an international or global context which supported these evolutions. Already at the beginning of the 20th century, Dutch research in the field of education was confronted with an emerging global system of science (cf. Depaepe, 1993; Novoa, 2000). As the analyses of the publications and citations in *PS* reveal, the awareness of, and openness to, global developments have drastically increased in the postwar period. But the increasing global convergence should not divert our attention from the details of national or regional developments. In this perspective, I have focused on evolutions in the disciplinary communication system of the field of education in the Netherlands. (Post)modern science is not based on the achievements of extraordinary individuals but on the epistemic force of both national and global disciplinary communities. Scientific disciplines are communication systems; their analysis requires an analysis of the diverse characteristics of their communication patterns.

Notes

1. From the 1970s onwards, the journal has clearly evolved into a subdisciplinary journal, specializing in school psychology. But the journal was/is well aware of its leading role in the field. It has ‘celebrated’ its own history on several occasions (1961, pp. 273–276; 1974, no. 1; 1988, pp. 502–513; 1998, no. 6). In fact, the journal’s dominant role is still uncontested. At present, it is the only Dutch journal whose status, in the context of research assessments, is judged to be equivalent to that of the journals included in the *Social Science Citation Index*.
2. For the history of scientific journals, see Smith (1972), Kronick (1976), McKie (1979), Manten (1980a), Bazerman (1988), Atkinson (1999). Most of these journals evolved from the newsletters of scientific societies. For many years, journals played a secondary role in relation to books.
3. I acknowledge the help of Ivo van Hilvoorde in drawing together these statistical data.
4. Around 1900, several educational journals with scientific pretensions were founded, viz. *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, 1901–1906] and *Kinderstudies* [Child Studies, 1916–1922]. But these journals served as the mouthpiece of the interests prevailing in particular teacher organizations, research institutes or religious groups. Moreover, for various reasons (lack of subscriptions, lack of contributions, conflicts among board members), all of them soon disappeared. Partly due to its institutional embedding in the public universities of the Netherlands, *PS* established itself as the central disciplinary journal.

5. These percentages decrease drastically when the period after 1970 is taken into account. On the other hand, the dominance of a small number of authors was even greater in the pre-War period. Between 1920 and 1941, three highly productive writers – Gunning (47), Diels (47) and Kohnstamm (59) – wrote 24,2% of all the articles, and the ‘top 10’ wrote 41,5% of the total amount. Such proportions are not unique to educational science in the Netherlands. Baumert and Roeder (1990), for example, found nearly identical ratios about the productivity of German professors in physics and in education. For a systems-theoretical view on the expansion of higher education, see Vanderstraeten (2000, 2004).
6. 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). In the early modern developments, the archival function of disciplines still dominated (Rorty, 1979, pp. 131–139; Stichweh, 2001). The discipline was a place where one deposited knowledge after having found it out, but it was not an active system for the production of knowledge. It is only in the course of the 19th and 20th century that the disciplinary structures acquire a much more determining role in the system of science.

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