
BRIEF COMMUNICATIONS

Journal deselection in a medical university library by ranking periodicals based on multiple factors

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INTRODUCTION

The Faculty of Medical Sciences of the University of Nijmegen, founded in 1951, includes about 272 researchers and 1,705 students. The faculty is affiliated with the Academic St. Radboud Hospital. This major hospital serving the southern part of the Netherlands had 921 beds in 1992 and provides all major medical services. The biomedical library supports all these researchers, physicians, and students. The total medical library collection includes about 98,000 volumes, and the library subscribes to 1,582 periodicals. The collection is distributed over twenty-one locations.

Within the next ten years, plans call for the library departments to be centralized. There will be one central budget for periodical subscriptions and one central Library Advisory Board for the faculty. A significant journal price increase (15%) and a decrease in the library budget for periodical subscriptions forced the library to consider cancelling a large number of journal subscriptions. Several methods for deselection are described in the literature, but no complete options suitable for this library could be found. Barschall [1] uses cost-effectiveness; that is, the rate of the cost per printed character to the frequency with which articles are cited. This method, in the author's judgment, places too much emphasis on journal prices. More suitable techniques are reviewed by Bourne [2]. He divides the collection into smaller, more workable groups before evaluation and focuses on criteria such as journal coverage by abstracting or indexing services, language of publication, availability elsewhere, local usage, and frequency of citation. He observes that library use is not a cost-saving measure because high-cost journals have high use. Segal [3] and Broude [4] also used multiple factors for deselection; use was the variable most often employed. Segal suggests that selection and deselection call for involved management and ongoing communication between librarians and users.

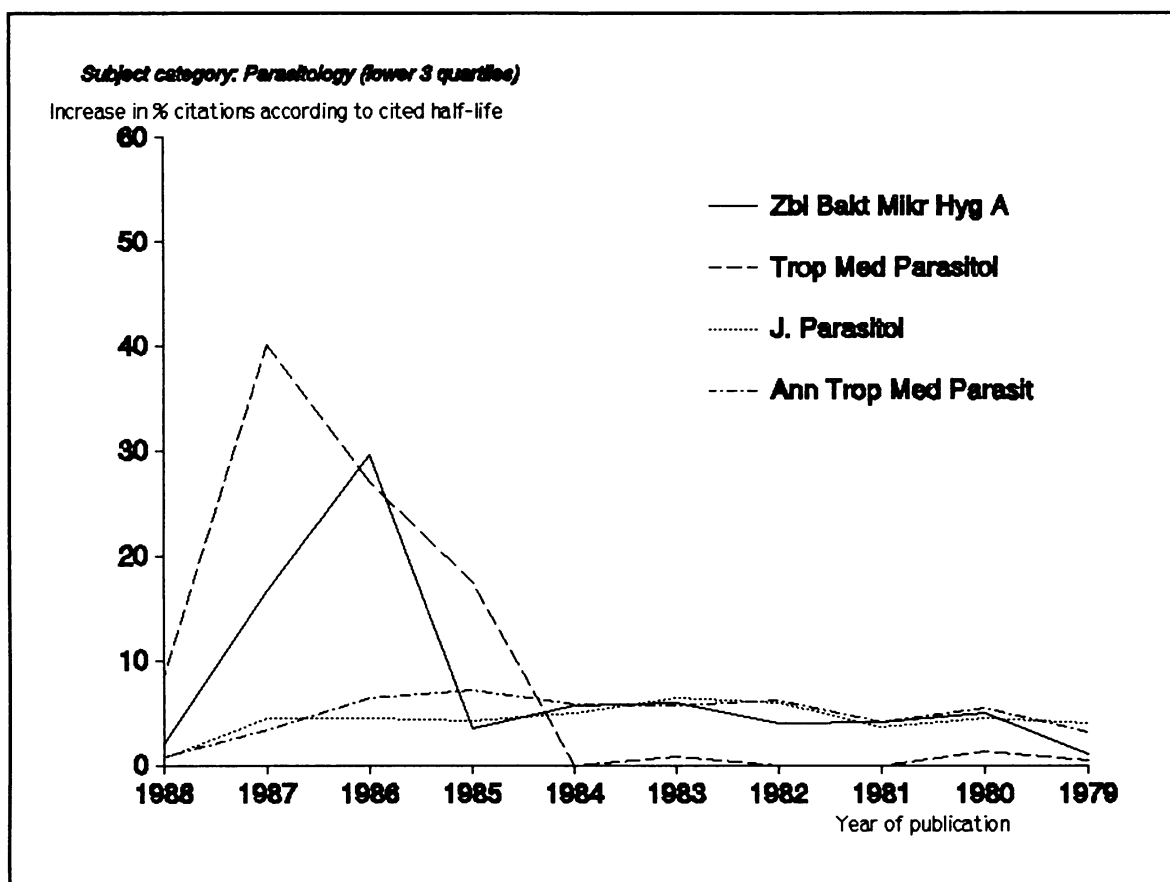
Smith describes the use of the *Journal Citation Reports* as a deselection tool and recommends combining impact factors with other criteria for deselection [5]. Vervliet also uses impact factors [6]. He addresses issues that complicate the use of the impact factors (i.e., journals with a changing title, new journals that don't have an impact factor, and non-English journals). Milne [7] and Chrzastowski [8] propose using a cost-effectiveness method for cancellation decisions if an effective rapid document delivery system is available. But these methods depend on a large volume of usage data, a resource not available at the biomedical library and difficult to obtain. Hunt developed a mathematical formula for journal deselection decisions [9]. Again, use is an important factor in this formula.

NEW DESELECTION METHOD

The author and colleagues have developed and implemented a new method for determining the core journals of the collection. This method considers not only the ranking of the journals by impact factor in their subject category (according to the Institute for Scientific Information's (ISI) subject category listing), but also the cited half-life. Impact factor is calculated by dividing the number of all current citations of source items published in a certain journal during the previous two years by the total number of articles published by the same journal in those two years. The cited half-life is defined as the number of journal publication years, counting backwards from the current year, that accounts for 50% of the total citations received by the cited journal in the current year.

Figure 1 shows the ten-year distribution of citations to four journals of the same subject category by year of publication of cited items. Two journals (*Zentralblatt fuer Bakteriologie Mikrobiologie und Hygiene, Series A*, and *Tropical Medicine and Parasitology*) receive many citations during a short period (often the first few years), and the two other journals (*Journal of Parasitology* and *Annals of Tropical Medicine and Parasitology*) receive significant numbers of citations for many years of publication. Such journals are incorrectly shortened if only the two-year period (1987 and 1986) used for the calculation of the impact factor is taken. Simply comparing the impact factors of journals in the same subject category is not correct, if one desires an indicator for citation frequency as a quality parameter. The cited half-life offers the opportunity to correct for these differences in citation behavior between journals. Therefore, one uses the product of impact factor and cited half-life. This is important for journals with a low impact factor and high value of cited half-life.

Figure 1
Chronological distribution of citations to four cited journals



We have used this in our evaluation for the ranking of subscriptions with an impact factor as follows.

All journal subscriptions were checked for an impact factor. The journal impact factor position was marked on ISI's subject category listing of 1988 (the most recent list available at that moment). Several journals were found in more than one subject category; in these cases, all positions were marked (Tables 1 and 2). Subsequently, each subject category with subscriptions was divided into four quartiles, and journals in the top quartile were considered to be core journals.

The cited half-life was the second important factor, especially for the other quartiles. Here the product of impact factor and cited half-life was used for ranking. In each subject category, the subscription in the highest quartile with the lowest product of impact factor and cited half-life was selected. Then the subscription with the lowest product from any of the other three quartiles was identified, and the average

was calculated. The mean was used as the threshold value.

Only journal subscriptions in the same subject category with a product of impact factor and cited half-life higher or equal to this value were continued. An exception was made for subscriptions with an impact factor but without a value for the cited half-life and *not* belonging to the lowest quartile; these journals always were continued. The library also considered new journals that had no cited half-life but were already strong enough to have received a relatively high number of citations. For all journals belonging to more than one category, the highest score was always used. A special treatment was also given to all scientific periodical subscriptions written in Dutch. These subscriptions were continued and needed no ranking.

This approach provides for a discretionary threshold for deselection. The cut-off point can be optimized to suit the situation. For present purposes, the mean

Table 1
Subject category listing from ISI journal citation reports 1988*

Parasitology	Impact factor	Cited half-life‡
1. <i>Advances in Parasitology</i>	x† 3.100	> 10.0
2. <i>Molecular and Biochemical Parasitology</i>	x 2.865	3.3
3. <i>Parasitology Today</i>	x 2.487	2.2
4. <i>Parasite Immunology</i>	x 2.431	3.7
5. <i>Parasitology</i>	x 1.821	8.1
6. <i>Experimental Parasitology</i>	x 1.585	8.9
7. <i>Zentralblatt fuer Bakteriologie Mikrobiologie und Hygiene, Series A</i>	x 1.000	3.4
8. <i>Tropical Medicine and Parasitology</i>	x 0.968	2.0
9. <i>International Journal for Parasitology</i>	0.871	6.3
10. <i>Veterinary Parasitology</i>	0.735	5.1
11. <i>Journal of Parasitology</i>	x 0.730	> 10.0
12. <i>Annals of Tropical Medicine and Parasitology</i>	x 0.614	> 10.0
13. <i>Proceedings of the Helminthological Society of Washington</i>	x 0.548	9.6
14. <i>Zeitschrift fur Parasitenkunde</i>	x 0.489	8.0
15. <i>Journal of Helminthology</i>	0.408	9.6
16. <i>Annales de Parasitologie Humaine et Comparee</i>	0.280	> 10.0
17. <i>Systematic Parasitology</i>	0.242	
18. <i>Folia Parasitologica</i>	0.228	7.3
19. <i>Parazitologia</i>	0.084	8.2

* The lines in the figure mark the quartiles.

† An x before the impact factor means that there is at this moment a subscription to the periodical.

‡ Calculation example: Subscription with the lowest value for the product of impact factor and cited half-life from the best quartile is number 3, *Parasitology Today* ($2.487 \times 2.2 = 5.47$ [decimals are always rounded to the nearest hundredth]). Subscription with the lowest product from any of the other three quartiles is: number 8, *Tropical Medicine and Parasitology* ($0.968 \times 2.0 = 1.94$). Average: $5.47 + 1.94/2 = 3.71$. Conclusion: numbers 1, 2, 3, 4, and 5 are continued because they belong to the best quartile. Numbers 6, 11, 12, and 14 are continued because the product of impact factor and cited half-life is above the average. Numbers 7 and 8 are proposed for cancellation; their product is below the mean.

is the point at which the cited half-life no longer can compensate for the low impact factor within that subject category. Below this average are journals with the lowest total citation frequency. The decision to start with the lowest product of the top quartile reflects the intention to continue more than 50% of the journal subscriptions with an impact factor. This method is expected to lead to cancellations approximately 35% or less in the group of journals with an impact factor. This calculation assumes a regular distribution of the subscriptions among the quartiles of all subject categories, based on continuation of all subscriptions in the top quartile and about 50% deselection in the lower three quartiles.

STEP-BY-STEP DESELECTION

First, the core titles are determined and all duplicates are cancelled. The remaining titles are ranked, based

Table 2
Anatomy and morphology*

Parasitology	Impact factor	Cited half-life‡
1. <i>Journal of Embryology and Experimental Morphology</i>	2.516	8.0
2. <i>Virchows Archiv A, Pathological Anatomy and Histopathology</i>	x† 1.689	> 7.2
3. <i>Anatomical Record</i>	x 1.425	> 10.0
4. <i>American Journal of Anatomy</i>	x 1.425	> 10.0
5. <i>Anatomia, Histologia, Embryologia</i>	x 1.418	5.9
6. <i>Journal of Anatomy</i>	x 1.004	> 10.0
7. <i>Zoomorphology</i>	0.784	6.4
8. <i>Journal of Morphology</i>	x 0.750	> 10.0
9. <i>Acta Anatomica</i>	x 0.579	> 10.0
10. <i>Advances in Anatomy, Embryology, and Cell Biology</i>	x 0.333	8.6
11. <i>Anatomischer Anzeiger</i>	x 0.240	> 10.0
12. <i>Surgical and Radiologic Anatomy</i>	x 0.188	
13. <i>Zeitschrift fur Mikroskopisch-Anatomische Forschung</i>	0.175	> 10.0
14. <i>Acta Morphologica Neerlandico-Scandinavica</i>	x 0.162	> 10.0
15. <i>Anatomia, Histologia, Embryologia</i>	0.137	

* The lines in the figure mark the quartiles.

† An x before the impact factor means that there is at this moment a subscription to the periodical.

‡ Calculation example: Subscription with the lowest value for the product of impact factor and cited half-life from the best quartile is number 4, *American Journal of Anatomy* ($1.425 \times 10 = 14.25$). Subscription with the lowest product from any of the other three quartiles is number 14, *Acta Morphologica Neerlandico-Scandinavica* ($0.162 \times 10.0 = 1.62$). Average: $14.25 + 1.62/2 = 7.94$. Conclusion: numbers 3 and 4 are continued because they belong to the best quartile. Numbers 5 and 6 are continued because the product of impact factor and cited half-life is above the average. The numbers 8, 9, 10, and 14 are proposed for cancellation, their product being below the mean. Number 12 is continued, because this is a recently started journal without cited half-life from the third quartile (see the motivation on page #).

on multiple rational factors such as internal and external requests, indexing in *Index Medicus*, language of publication, publisher's fame, and scope. Information concerning quality of periodicals, certainly required for those without an impact factor, is obtained by examining the treatment of these titles by the abstracting and indexing services. (If a title is not covered by one or more of these services, the publication often is of marginal value). This information is especially important for journals that require a publishing period of several years to get an impact factor and for European journals. These journals need special consideration, because European research progress is of special interest in the Netherlands.

The process results in the following listings: ranking all journals with an impact factor in their subject category, all cancellation candidates (duplicates), all subscriptions written in Dutch, and ranking all remaining titles.

RANKING REMAINING TITLES

The remaining periodicals (about 40% of the total) are ranked according to multiple criteria. This mix of periodicals contains all journals without an impact factor not belonging to the cancellation or continuation list and the journals with impact factor provisionally selected for cancellation. Each periodical receives points in the following way:

- one point if it is indexed in *Index Medicus*;
- one point if it has an impact factor (a preliminary cancellation);
- one point for high use (based on internal requests) and two points for very high use;
- one point if the articles are written in English and the periodical has a broad scope and well-known publisher; and
- one point if the periodical belongs to the 1,000 most requested periodicals in interlibrary loan in the Netherlands during nine months of 1990. (This list is produced by Project *geIntegreerde Catalogus Automatisering* on the request of the Koninklijke Bibliotheek in The Hague.)

Periodicals with a score of 5 or 6 are recommended for continuation and the others for cancellation.

DEVELOPING THE FINAL PROPOSAL

The head of each clinical or preclinical department is asked to review the lists. They may argue for change based on research, education or patient care needs. The proposal is modified based on their comments.

The modified proposal is sent to the Research Committee of the Medical Faculty, the staff of the Academic Hospital, and to all twenty-nine special library committees of the several hospital departments.

RESULTS

Ultimately, the Library of Medical Sciences cancelled 514 of 1,582 titles and started thirty-one new periodicals. Most are subscriptions for new research groups and for new journals. Most journals with an impact factor were continued (752 of 913), and, of the 669 titles without an impact factor, 316 were continued or started, and 353 were cancelled.

CONCLUSION

Journal deselection in academic libraries is a complicated task. This paper describes a method for deter-

mining core journals based on a combination of impact factor and cited half-life, followed by an evaluation of all journal subscriptions. This evaluation often produces a negative and positive rating for the same journal. Extensive discussion with users, scientists, and physicians is essential so that users are aware of proposed changes in the library collection and can influence the process.

The approach described minimizes the disadvantages of impact factors by using additional variables, such as indexing and abstracting availability, interlibrary loan data, local use, use in curriculum, local research, and consultation of the users. The process seems satisfactory; only 4 complaints were received during a twelve-month period.

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