

# Citation Analysis of Education Dissertations for Collection Development

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*The reference lists of forty-three education dissertations on curriculum and instruction completed at the University of Minnesota during the calendar years 2000–2002 were analyzed to inform collection development. As one measure of use of the academic library collection, the citation analysis yielded data to guide journal selection, retention, and cancellation decisions. The project aimed to ensure that the most frequently cited journals were retained on subscription. The serial monograph ratio for citation also was evaluated in comparison with other studies and explored in the context of funding ratios. Results of citation studies can provide a basis for liaison conversations with faculty in addition to guiding selection decisions. This research project can serve as a model for similar projects in other libraries that look at literature in education as well as other fields.*

As a component of the collection development toolkit, citation analysis can yield data regarding use of library collections to guide and support selection decisions. Given current conflicting and increasing pressures on library collection budgets, academic librarians with selection responsibilities may want to draw on tools such as citation analysis for help in making decisions about journal acquisition, retention, cancellation, and provision of electronic access.

Librarians with selection responsibilities in academic libraries often are liaisons to academic departments. A key role in liaison work is consultation with faculty regarding collection decisions.<sup>1</sup> Results of a citation analysis study can be a useful part of those faculty liaison conversations by offering data on journal use. Such data might help focus faculty comments when there is disagreement about proposed cancellations.<sup>2</sup> Additionally, data from citation analysis and other methodologies can provide documentation supporting selector decisions. This documentation may be requested to support fiscal and other types of accountability.

A variety of tools are used in academic libraries to assess collection use. Circulation and shelving data, cost-per-use measures, interlibrary loan studies, reviews of core lists, citation analyses, and other methods are regularly employed. No one method will provide a full picture of collection use. Assessments that use several methods are likely to offer the most valid outcomes.<sup>3</sup> While high or low use of a journal may not necessarily dictate selection, retention, or cancellation decisions, use patterns do enable close examination of the subscription and associated costs. Those new to selection and serials management may want to consider using methods such as citation analysis as they explore ways to evaluate and balance their collections. The methods outlined

here can serve as an introduction to the process and as a model for those wanting to undertake a similar study in disciplines other than education.

### Citation Analysis of Theses and Dissertations

Academic librarians have long used various types of citation analysis to study collections. Analysis of dissertation and thesis reference lists is one approach used to measure library use by graduate students, who are traditionally frequent and heavy library users. Dissertations may be “invaluable roadsigns” to the literature of a discipline.<sup>4</sup>

Recent examples of this methodology include Sylvia and Leshner's study of psychology and counseling dissertations and theses, Marinko's research on women's studies dissertations, and Kuyper-Rushing's examination of music dissertations.<sup>5</sup> While citation analysis studies have tended to rely on local institutional data, some have integrated data from other institutions.<sup>6</sup> Buchanan and Herubel explored serial monograph ratios comparing political science and philosophy dissertations and found that journals were heavily used in these disciplines.<sup>7</sup> Beile, Boote, and Killingsworth studied education dissertations from the perspective of reference list quality to assess student expertise in use of the literature. They advised caution in using the results of a citation analysis to assess the adequacy of a collection.<sup>8</sup> Citation study results may have implications for the ratios of funds expended for serials versus that for monographs.<sup>9</sup>

One of the advantages of citation analysis of thesis and dissertation references lists is that the results may reliably predict faculty use. Zipp analyzed several large data sets from theses and dissertations in geology and biology.<sup>10</sup> Her statistical analysis supported the predictive value of the graduate student citations in identifying faculty journal citations in their publications. While logical given the mentoring and advising roles of faculty, Zipp's research began to validate the role that the dissertation and thesis writers' reference lists can have in identifying faculty reference patterns. This information is valuable because comprehensively identifying faculty journal publications for study can be difficult.

As true for citation studies with other types of materials, a disadvantage of dissertation citation analysis is that the results usually reflect only those sources actually included in the completed dissertation or thesis and not the many other sources consulted during the research and writing process.<sup>11</sup> Further, an underlying assumption in graduate research is that students will retrieve, use, and cite important journal articles and other materials even if they are not held in the local library collection. In reality, some graduate students may rely primarily on sources that are local or conveniently available, and their reference lists may then

reflect that.<sup>12</sup> In such a scenario, a weak collection could lead to inadequate study of the literature for a dissertation that then might be reflected in the reference lists and so on, in an unfortunate self-perpetuating cycle. Faculty members, in contrast, often have personal subscriptions and extended professional networks and so are less likely to depend on the convenience of their local collections. An additional consideration in evaluating the local data derived from a citation analysis study is that the results may be skewed by citations for specific sources heavily used by a few students during the particular time period analyzed.

### Citation Analysis of University of Minnesota Education Dissertations

The citation analysis study reported here was undertaken during a cancellation project to develop an indication of education journal collection use as reflected in curriculum and instruction dissertations completed at the University of Minnesota during the calendar years 2000–2002. Students in the College of Education and Human Development's Department of Curriculum and Instruction complete most campus dissertations on curriculum and instruction topics, although a few students in other disciplines also complete research in this area. The large, diverse, and highly ranked Department of Curriculum and Instruction at Minnesota emphasizes teacher preparation and educational research in curriculum, instruction, assessment, and the various contextual factors impacting education.

This author, as education librarian and bibliographer, undertook the study to understand current journal use patterns. In addition to the usual financial pressures on collection development funds leading to cancellations, the education collection was moved in the late 1990s from a separately housed, broadly focused Education Library and integrated into the main library serving the humanities and social sciences. These two factors prompted a review and refocusing of the education serial subscriptions with the broad goal of better aligning the subscriptions with the current teaching and research mission of the college.

Several specific purposes guided this project. The first aimed to identify the journals the dissertation writers cited most frequently and to determine if the University of Minnesota Libraries have the high-use journals on subscription. Identification of high- and low-use titles is one of the most common uses of citation analysis. Clearly, the academic research library should, if possible, have subscriptions to journals with high frequency of citations, depending on cost and scope considerations.

Second, the ratio of serials to monographs was explored to identify the current ratio of journals to monographs cited in education. Other researchers have studied this ratio. Beile,

Boote, and Killingsworth reported a 45 percent serial-to-monograph cited ratio in a citation analysis of education dissertations.<sup>13</sup> Previously, in an overview of many studies on the serial-to-monograph ratio in a wide range of diverse disciplines, Devin and Kellogg reported ratios of 40.5 percent to 42.6 percent for serial use for education.<sup>14</sup> A similar ratio was expected in this study.

Finally, the ratio of serials to monograph use was explored in comparison to the allocation of money in the library's education fund. In many academic libraries, funds for purchases are allocated by discipline, and within the discipline the allocation is divided between serial and monograph purchases. Budget constraints may preclude any changes in allocations; however, having some indication of use offers an opportunity to reconsider the allocation ratio. Such comparisons can be problematic for the discipline of education because education acquisitions in large academic research collections may be supported not only by an education fund but also by funds from many other disciplines.

### Research Methods

To identify dissertations, the Digital Dissertations database was searched for references to University of Minnesota dissertations completed in 2000–2002 using the advanced search Subject Tree function for education and the category term “curriculum and instruction,” combined with the appropriate selection from the School Index advanced search function. In a second search strategy, all faculty names from the Department of Curriculum and Instruction Web page were input using the “advisor” field to retrieve any other dissertations completed by students in that department. These two searches resulted in the retrieval of forty-three dissertations. The majority of these dissertations were completed in the Department of Curriculum and Instruction, some had co-advisors from different departments within the College of Education and Human Development, and a few were completed in departments external to the college.

Dissertations were retrieved from the library's collections and the reference lists were examined. For each dissertation reference list, the journal title and citation date were listed in a format that allowed use of the Excel Sort command. The count of journal and non-journal references was tallied. The citations to report literature were examined and were found to vary widely in accuracy and completeness. Given the problems with accuracy and format of report literature citations, correct categorization of these references was not possible without examining the original documents. Thus, a decision was made to include ERIC documents, technical reports, and other non-journal references in the same category as monographs. An alternative would have been to exclude these types of citations from the study.

### Results and Discussion

In this study, 4,542 citations from forty-three education dissertations completed in 2000–2002 were identified, with an average of 105 citations (range = 41–295) per dissertation. These findings support the notion that graduate students are likely to be heavy library resource users, although it is not possible to determine where or how these students obtained their literature. As highlighted in table 1, 44 percent (2,001) of the citations were for journal articles, and 56 percent (2,541) were for monographs and reports. More than half of the citations (57 percent) were from works published in 1990–2002 (see tables 1 and 2).

The graduate students cited 558 unique journal titles. This is considerably more than the 293 unique titles found by Beile, Boote, and Killingsworth in their analysis of education dissertations.<sup>15</sup> They examined a smaller pool of 1,842 citations from thirty education dissertations, with the number of citations per dissertation ranging from 25 to 159. This difference in unique titles may be due simply to sample size. Further, a scan of the titles for the University of Minnesota education dissertations examined here indicates that these students have researched a very diverse range of topics, suggesting a need for access to an equally diverse range of journals. Institutional differences in mission, teaching, and research could translate into varying patterns of literature use and citation, as could wide-ranging faculty research interests. These differences also could reflect evolving changes in the nature of research in the field of education overall.

The most frequently cited journal, *Educational Leadership*, was cited seventy-four times. Table 3 lists the eighteen journal titles cited twenty or more times. (Readers wishing to see the complete list of titles may contact the author.) These accounted for 30 percent of the total journal citations. About half (47 percent) of the journal citations were from the thirty-nine journals cited ten or more times. Interestingly, as noted, *Educational Leadership* was the most frequently cited journal in these University of Minnesota dissertations, but in Beile, Boote, and Killingsworth's study, it did not rank particularly high in the list of journals cited, again suggesting sample or institutional differences.<sup>16</sup>

Several of the most frequently cited journals are not considered to be education journals (such as *American Journal of Physics* and *Social Change*). These titles reflect the interdisciplinary nature of educational research and well as the skewing of results by a few dissertation writers. Additionally, they serve as a reminder of the importance of collaboration with other discipline selectors during journal cancellation projects.<sup>17</sup>

As in other citation studies, a large number of journals were found to have very few citations in this group of dissertations. As shown in table 4, 55 percent (309) of the

**Table 1.** Frequency of types of citations

Type of citation	Count	Percentage
Journals	2,001	44
Monographs and reports	2,541	56
<b>Total</b>	<b>4,542</b>	<b>100</b>

**Table 2.** Dates of journal citations

Date range	Frequency of citation
2000–2002	57
1990–1999	1,146
1980–1989	572
1970–1979	166
1960–1969	37
Pre-1960	23
<b>Total</b>	<b>2,001</b>

**Table 3.** Journals with more than twenty citations with citation frequency

Cited journal title	Frequency of citation
<i>Educational Leadership</i>	74
<i>Phi Delta Kappan</i>	66
<i>Journal of Research in Science Teaching</i>	52
<i>Reading Research Quarterly</i>	51
<i>Reading Teacher</i>	41
<i>Science Education</i>	40
<i>Journal of Educational Psychology</i>	39
<i>Educational Researcher</i>	35
<i>American Educational Research Journal</i>	35
<i>Elementary School Journal</i>	31
<i>Review of Educational Research</i>	31
<i>Studies in Art Education</i>	31
<i>Social Change</i>	30
<i>Journal for Research in Mathematics Education</i>	29
<i>American Journal of Physics</i>	26
<i>Language Arts</i>	25
<i>School Science and Mathematics</i>	23
<i>Journal of Teacher Education</i>	22
<b>Total</b>	<b>681</b>

journals were cited only one time. While many of them were education journals, many were from other disciplines. Some of these less cited journals could become candidates for review (using other evaluation criteria as well) for potential cancellation, if currently on subscription.

Many explanations are possible for infrequent use of certain journals and it can be challenging for the librarian to discern which of them applies to specific journals. Location in the library, completeness of cataloging records, availability of electronic access, usability of the library Web pages, inclusion in key indexes, and number of articles published per year are examples of the many factors that could affect frequency of use of a journal. However, the disserta-

tions examined in this study were drawn from three years—2000–2002—a period too short to accurately measure infrequency of use. A more accurate list of infrequently used titles could be developed by examining dissertation reference lists over an extended period of time or by sampling several two-year clusters.

With the one exception—*Physics Teacher*, which was cancelled previously—all of the journals cited ten or more times are active subscriptions at the University of Minnesota. *Physics Teacher* will be considered for reinstatement. Although not evaluated in this study, the availability of high-use journals in electronic format would be helpful from a collection development perspective.

Comparing the ratio of serials citations to monograph citations (44 percent to 56 percent) with the ratio of funds allocated for purchase of those materials proved problematic. The overall education acquisition funds ratio (85 percent serials to 15 percent monographs) varies widely from the citation ratios. This difference is moderated because a number of non-journal items such as electronic indexes are included in the serials funds. Further, the fund balances are affected by adjustments for funds carried over from previous years, rescission of money from the allocations, and other similar factors, as well as the difficulties inherent in comparing a monograph purchase to a serial subscription. Additionally, an unidentified number of education journals are paid with funds from other disciplines, further complicating the development of accurate ratios. The relationship of funding ratios to citation ratios could be explored in further research.

Regardless, given the citation ratio obtained in this study of University of Minnesota education dissertations and the school's mission of supporting faculty- and graduate-level research, it is appropriate to aim toward a more balanced ratio of funding for education monographs and serials. The practice of diverting funds from monograph purchases to support increasingly expensive serials could negatively impact education graduate students' access to the monographs needed to support their dissertations.<sup>18</sup> Interlibrary loan can supplement gaps in collections, but many graduate students may not have the expertise to access comprehensive literature sources in that manner.<sup>19</sup>

## Conclusions

Citation analysis of dissertations is a tool that academic librarians can use to develop an indicator of collection use by graduate students. Results can inform and support collection development decisions and be used effectively in liaison work. Those new to selection in a particular discipline or library may find this type of methodology to be a helpful tool for understanding the use of their collections. Dissertation

**Table 4.** Overall frequency of citation by journal

Count of citations	Journal cited frequency
60 or more citations	2
50–59	2
40–49	2
30–39	7
20–29	5
10–19	21
9	4
8	10
7	12
6	11
5	14
4	25
3	35
2	99
1	309
Total count of journals cited	558

citation information is not difficult to obtain and tabulate. Procedures could be established for collecting dissertation reference data routinely to establish a larger data set spanning a several years. Dissertation citations may predict faculty journal article citations, a finding that if replicated in different disciplines and studies, offers librarians opportunities to more readily assess faculty use.<sup>20</sup>

Citation use data alone does not give a complete picture of collection use and should be combined with other indicators. Further, graduate students may lack skills needed to identify, obtain, and then use the best quality literature for their dissertations, relying instead on materials available at their institution's library.<sup>21</sup> If collections are weak, the reference lists may reflect an inadequate use of the literature—unless students are taught by librarians and faculty advisors and are challenged to expand their retrieval of literature by using interlibrary loan and other retrieval methods.

More research is needed to explore further the relationship between faculty and graduate student reference lists, to learn how graduate students actually obtain literature in the Internet era, and to explore the types of literature consulted—in contrast to cited—in dissertations. Additional studies could help clarify the length of time needed for a citation study to reveal a true picture of collection use and the breadth of graduate student knowledge and use of interlibrary loan.

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