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ABSTRACT

The purpose of this study was to evaluate the chemistry collection of the College of Wooster's Chemistry Library. In particular, the extent to which the library supports the curriculum of the chemistry and biochemistry program by providing additional sources to supplement course textbooks was evaluated. Focus was on materials present in the collection on the College of Wooster campus, but the extent to which materials can be obtained through resource sharing was also considered. The study addressed: the extent of overlap of the College of Wooster's holdings with the materials cited in its required chemistry books; whether this overlap differs for the various subfields of chemistry and whether the overlap of monograph citations differs from that of journal citations; and whether this data indicates that the College of Wooster's chemistry collection is of high or low quality, gaps in its coverage, and suggestions that can be made for improvement. A total of eight undergraduate textbooks were examined for citations. (AEF)

EVALUATION OF THE CHEMISTRY COLLECTION OF A FOUR-YEAR COLLEGE LIBRARY BY MEANS OF TEXTBOOK CITATION ANALYSIS

A Master's Research Paper submitted to the
Kent State University School of Library and Information Science
in partial fulfillment of the requirements
for the degree Master of Library Science

by

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I. INTRODUCTION

Why Evaluate Library Collections?

A library's worth is based on its ability to fulfill its mission, whether that mission is to members of a community, students at a college, or scientists at a corporation. The major tools that the library uses in this effort are its staff and its collection. Even in these days of increasing emphasis on access rather than ownership of items, most library users seek information in the materials actually present in the library's collection, so it is necessary to determine regularly the strengths and weaknesses of the collection, areas in which it is out of balance, in need of weeding and updating, or simply underused. Tight budgets make it necessary to restrict acquisitions to only the "best" books and periodicals. Periodic evaluation of the collection is particularly vital in fast changing subject disciplines such as the natural sciences, where growth of the literature and its obsolescence occur rapidly.

The four-year college library presents a unique set of evaluation challenges due to its focus on supporting the curriculum. This type of evaluation is distinctly underrepresented in the literature when compared to assessing a collection for adequacy in research. Techniques to accomplish this do exist, however, and will be considered below.

The College of Wooster is a four-year liberal arts college with an enrollment of about 1700 students. It possesses a strong program in the natural sciences, and the Chemistry department includes 10 faculty members, offering majors in chemistry and in biochemistry. The Chemistry building is the focus of a large-scale renovation and remodeling project, which indicates a strong administrative commitment to the program.

The library's science collection is currently distributed among the science buildings, with the Chemistry collection housed in Severance Hall; however, an existing campus building is being remodeled to become the Timken Science Library, and will house a united science collection. The College of Wooster is part of the Five Colleges of Ohio consortium, which also includes Denison University, Kenyon College, Oberlin College, and Ohio Wesleyan University. The initial focus of the consortium has been on library cooperation, with four of the five colleges merging their online catalogs into a single system. The combined library system is a member of OhioLINK, offering extensive interlibrary loan services.

The purpose of the study is to evaluate the chemistry collection of the College of Wooster's Chemistry Library. In particular, the extent to which the library supports the curriculum of the chemistry and biochemistry program by providing additional sources to supplement course textbooks will be evaluated. The focus will be on materials present in the collection on the College of Wooster campus, but the extent to which materials can be obtained through resource sharing will also be assessed. The following questions will be addressed in this study:

1) What is the extent of overlap of the College of Wooster's holdings with the materials cited in its required chemistry textbooks?
2) Does this overlap differ for the various subfields of chemistry? Does the overlap of monograph citations differ from that of journal citations?
3) Does this data indicate that the College of Wooster's chemistry collection is of high or low quality? Are there gaps in its coverage? What suggestions can be made for its improvement?

CHAPTER II. LITERATURE REVIEW

The literature contains many articles on evaluation of library collections. Baker and Lancaster provide a detailed overview of a variety of material- and use-centered collection evaluation techniques.[1] Material-centered approaches include evaluation by experts, comparing holdings against standard checklists, citation analysis, estimates of comprehensiveness, and quantitative comparison to a figure determined by formula or to the collections of other institutions. Use-centered approaches include analysis of circulation and interlibrary loan data, as well as the study of in-house use by such techniques as table counts or patron questionnaires.

Techniques for collection evaluation must be fine-tuned to the mission of the library being evaluated. Large academic libraries in a university setting frequently are concerned with whether their collection furnishes sufficient resources for research, while in smaller academic libraries the concern is to provide materials in support of the teaching curriculum.

Evaluation of Undergraduate Library Collections

Assessment of the collection of an undergraduate institution must be done in the context of the library's mission of curricular support. In 1995-6, Kelley conducted a survey of directors of small college libraries having only one or two professional staff to determine which evaluation techniques were considered most and least effective in gathering information about library resources and the curriculum.[2] She found that the most-used techniques were surveys of the collection performed by the faculty, followed by in-class student surveys, and catalog, syllabus and ILL analysis. Citation analysis was

used least. She then extended the study to a sample of librarians from slightly larger institutions, and found a similar list of techniques, with the addition of direct faculty contact. Logically, in both cases the survey techniques, which received the greatest use, were ranked as most effective.

Frances Davis has published a plan for a comprehensive evaluation of a community college library collection: faculty members in each discipline were assigned a section of the classification system to examine for gaps in coverage and make suggestions regarding future materials purchases.[3] She found that the faculty was quite willing to participate in the evaluation, and that they benefited from their resulting improved knowledge of the collection. Bradley used another approach, suggested by the conspectus of the Library and Information Resources for the Northwest regional assessment project, in assessing the science collection at a community college library.[4] She assigned LC classification numbers to the subjects covered in course catalog descriptions and syllabi, and then examined the shelves to determine if sufficient up-to-date materials were present for each classification area. By "cataloging the curriculum," she was able to tie her collection evaluation closely to the course offerings.

In all of the above cases, relatively subjective judgments are being made about what sorts of materials constitute a quality collection. Personal assessments by faculty or librarians can certainly serve as "expert opinions," but it would also be useful to be able to quantify these assessments in some fashion. Some techniques for so doing are listed below.

Citation Analysis Techniques

One way of "objectifying" collection analysis is by comparing a collection to some form of checklist. This list may be from a standard bibliography, or from the collection of another library known to have a strong collection in the subject under consideration. However, these lists may not contain material best suited to the particular needs of the library in question. Also, standard lists quickly become dated in quickly growing subject areas, especially the natural sciences. To go beyond these limitations, a subject collection can be checked against a list compiled by citation analysis. According to Baker and Lancaster, this method yields a customized bibliography that reflects the sources actually needed to perform research in a field of study.[5] The big advantage of citation analysis for collection evaluation is the ability to fine-tune the criteria to the mission of the library and to the local research and teaching needs. Also, this method yields references to allied disciplines, which offers an indication of the degree of overlap desirable between collections in these disciplines. However, the technique has several disadvantages, including the fact that categories of material such as indexes and abstracts are frequently read but rarely cited, and the material most useful to practitioners in a field may not be that cited most often in the research in the field.[6]

One common use of citation analysis is to determine the core journals of a field, on the assumption that journals which are frequently cited are of higher quality than others less frequently cited, after correcting for differences in the gross number of articles published per journal.[7] This 'global' ranking of sources can be customized for local needs by analysis of local citation patterns. Greene has analyzed the citations of the Emory University Physics department to find a typical scatter pattern: nearly half of the

references studied were "concentrated in only eleven of the 276 titles [available at Emory]," and almost 97% of the journals cited were available on campus.[8] The question of whether this reflects the quality of the collection or the unwillingness of the faculty to venture off campus in search of materials was not considered. A similar study was conducted by Johnson, who used the results to answer specific, timely questions about changes in journal purchasing.[9] He studied the citations of the statistics faculty at Texas Tech University over a two-year period, and compiled a list of sources cited at least three times. He then established a goal to "provide at least 90% of the journals and monographs found in this group."[10] Purchases of three monographs and two journals were recommended to achieve this goal. In contrast, although some faculty members had requested subscription to a new journal, no citations to it were found in the study and no ILL requests had been made for the title. It was therefore determined not to add this title to the collection.

The Textbook Citation Method

Citation analysis techniques such as those discussed above can be extremely useful in larger universities, where sources cited in current research output are a good predictor of the types of sources likely to be needed and used in the future. Can these techniques be applied to the educational-support mission of a college or community college library, however? The literature of research may not be on target for a college library, but Bland suggests another source to compile lists of citations: the course textbook.[11] Bland lists several advantages to citations obtained from textbooks. For instance, materials cited in textbooks have been "prequalified" in the sense that the

authors have chosen to cite high-quality works, which are directly relevant to the coursework. Also, these materials represent the "first tier" of information sought to supplement the information in the text itself. Bland's comparison of sample text-generated citations with the standard list source *Books for College Libraries* revealed from 16 to 50 percent overlap depending on discipline. Thus, textbook citations represent a significant source of materials to enrich the collection.

Stelk and Lancaster performed a pilot study of this technique in the subject of religious studies at the University of Illinois at Urbana-Champain's Undergraduate Library.[12] They found that the Undergraduate Library held from 41 to 56 percent of the bibliographic references obtained from the course textbooks, and this figure rises to approximately 80 percent if holdings from all campus libraries are considered. They concluded that textbook citations can form a useful component in college collection evaluation.

Currie also employed this technique in evaluating the collection of a branch campus of Bowling Green State University, which offers associate degrees and the first two years of a normal college curriculum.[13] His desired level of holdings was 30 percent in the local collection, with 75 percent available when the university's holdings were added. His results were a hit rate of 21 percent on the local campus and 59 percent university-wide, but he also analyzed hit rates for individual courses. These rates ranged from zero to 53 percent, and Currie suggests that extensive weeding and rebuilding may be necessary in areas of the curriculum that had extremely low hit rates.

The textbook citation method is not a classical collection evaluation technique, but based on the results above it may prove quite useful as an adjunct to the standard

techniques. It can identify sources to enrich the collection or indicate areas where attention is needed, and give insight into the extent to which the collection serves to enhance the information available in required course materials. Of course, textbooks are seldom used in some disciplines, but if other sources of references such as reserve material or lecture notes are used, a variation of this technique may be employed.[14] In courses with no required readings, obviously, the technique is not useful.

CHAPTER III. METHODOLOGY

The proposed study will utilize Bland's concept of citation analysis using undergraduate textbooks. Thirteen courses are offered in Wooster's chemistry program in the 1997-1998 academic year, excluding internships, tutorials, and Independent Study Thesis which is an independent research course (see Appendix A). Of these thirteen courses, two lack a textbook. Another course has a list of readings, which will be included in the analysis. Lists of references will be compiled and sorted for each textbook, and any duplicates will be deleted; if syllabi can be obtained, reference compiling will be limited to the chapters included in the syllabus. In courses with multiple textbooks, required chapters of all texts will be included. The reference lists will be checked against holdings on the College of Wooster campus and against the holdings of the Five Colleges of Ohio consortium (CONSORT). Monographic materials will also be checked against materials available through OhioLINK.

Data will be summarized and analyzed, and the implications of the results will be discussed. The extent of overlap of the College's library holdings with citations in the texts will be determined. This overlap provides a feel for the extent of support for the chemistry curriculum offered by the library. Overlap will be computed for individual courses as well to assess whether the chemistry collection is balanced among the several subfields. It is expected that the overlap will be considerably less than complete - perhaps on the order of 50 percent as found by Stelk and Lancaster. Separate analyses will be conducted for the consortium data and OhioLINK data.

The study will be limited to course materials required by this year's chemistry curriculum at the College of Wooster. As not all courses may be offered every year, the

study will not encompass every subfield of chemistry available. Interdepartmental courses, such as sections of Freshman Seminar taught by members of the chemistry department, will be excluded, as will courses which have no required readings. The findings of this study are not necessarily generalizable to all libraries in four-year liberal arts colleges.

CHAPTER IV. ANALYSIS OF DATA

A total of eight textbooks were examined for citations. In four cases, one textbook was used for two courses; for example, the same textbook was used for both semesters of Biochemistry. In these cases, citations from each textbook were treated as a unit rather than being broken down into the separate halves. Citations found in supplementary material such as laboratory syllabi or reading lists were added to textbook citations from the same courses. No attempt was made to treat these citations separately from the textbook citations.

Monograph and journal citations were handled separately to facilitate data collection (see Appendix B: sample coding sheets). A master list was compiled for all monograph citations, and duplicate citations from the same textbook or course were removed. In the rare cases in which the same monograph was cited in more than one course, the duplicate citations were retained. These materials were then checked for availability on the College of Wooster campus, at a CONSORT library, and via OhioLINK by reference to the OhioLINK Central Catalog at http://olc1.ohiolink.edu/search/.

The data collected for citations to the periodical literature differed somewhat from that for citations to monographic materials. Libraries generally do not catalog particular issues of serials, but purchase them by annual subscription. Data collection for journals, therefore, was limited to journal title and year. This level of data collection permitted easy documentation of journal runs held without the need to peruse the contents of individual issues. This data treatment necessarily collapses citations to

different articles in the same issue or year of a journal into apparent duplicate citations. Therefore, journal citation data were analyzed without removal of duplicates.

The distribution of citations quickly revealed a large-scale pattern, shown in Table 1: textbooks used in classes for non-Chemistry majors, and in the first two years of the major program, tend not to contain citations. In most chemistry programs, the first courses a major takes consist of one year of introductory inorganic chemistry and one year of organic chemistry. Many non-chemistry majors such as biology or pre-med majors also take these classes. Some textbooks at this level do contain citations, but most of those examined, including several not in use at the College of Wooster, do not. In contrast, textbooks used for more advanced courses are all rich in citations to the original literature. Upper level classes such as analytical chemistry or physical chemistry are attended almost exclusively by chemistry majors; perhaps authors of these textbooks are attempting to foster students' familiarity with the literature that they will be dependent on in their academic careers.

Analysis of Monographic Citations

A total of 824 unique citations to monographic materials were collected from the textbooks and reading lists examined (see Table 2, Summary of Monograph and Journal Data). The most notable observation was the fact that only 55 cited items (7 percent) were unavailable from any source examined in this study. Of the remaining materials, 48 percent were available on the College of Wooster campus, with the remaining 45 percent obtainable at one of the CONSORT libraries or via OhioLINK.

Citation data were separately analyzed by course. The number of citations per course varied widely, but the proportions of materials available by various means was relatively consistent among citations gleaned from textbooks. Percentages of items held by the College itself ranged from 55 percent for Physical Chemistry to 38 percent for Biochemistry. This result is similar to the approximately 50 percent overlap found by Stelk and Lancaster.[15] CONSORT libraries supply another 15 to 23 percent of cited materials, and other OhioLINK libraries yield 17 to 36 percent more materials.

Two reading lists were examined, one for "Organic Chemistry," taken from a laboratory syllabus, and the other for a course entitled "The Role of Science and the Scientist in Society." Both lists contained only monographic materials. It is a common assumption (at least by hapless students) that all items professors place on course reading lists are owned by the library. In the case of the reading list for Organic Chemistry, the assumption is justified: the College of Wooster owns all the materials listed in it. In contrast, the College owns only 65 percent of the items on the reading list for "Science and Society," 31 percent can be obtained from CONSORT or OhioLINK, and two items (4 percent) are unavailable even through OhioLINK.

Analysis of Journal Citations

Analysis of the journal citation patterns yields similar results (see Table 2). Of 1682 total citations, 1102, or 65 percent, are available on the College of Wooster campus. Travel to one of the other CONSORT libraries affords access to another 20 percent of the materials. A higher percentage – almost 15 percent - of the journal materials were deemed unavailable. This reflects a difference in the treatment of

monograph vs. journal citation data: items at non-CONSORT OhioLINK libraries were not counted. Since monographs circulate nearly effortlessly using CONSORT or OhioLINK software, while journal issues do not circulate, students who need an article not in their school's library must either visit another library or obtain the article via CARL Uncover or a similar service, which is outside the scope of this study. Thus, although almost any journal can be obtained at at least one OhioLINK library, this ownership was not considered to grant access, and only holdings from the nearby CONSORT libraries were considered.

When journal results were broken down by course, differences in the level of coverage become apparent. A full 80 percent of the Inorganic citations were held by the College of Wooster, in contrast to only 13 percent of the Physical Chemistry citations. This result is deceptive, however, in that all but two of the Physical Chemistry citations are from *The Journal of Chemical Education*. Wooster's run of this journal is incomplete, and the missing years form the bulk of the citations. Biochemistry did quite well, with 70 percent of the citations available on campus, even though this course yielded by far the largest number of journal citations. Fifty eight percent of the Analytical Chemistry citations were available. CONSORT libraries yielded 32 percent more Analytical Chemistry materials, with 17 percent more Inorganic Chemistry materials and 9 percent more Biochemistry articles available by this route.

Focusing on the journal titles themselves may provide insights into practical ways to enrich the collection. A total of 152 journals were cited in the textbooks examined (see Table 3). Of these titles, only 18 were cited by more than one textbook. Nearly half of the journals are available at the College of Wooster, and another 17 can be obtained at

CONSORT colleges. This leaves 60 titles unavailable except through document delivery services. If sorted by the number of citations received, nine journals account for over half of the citations and would form the "core list" (see Table 4). The College of Wooster owns at least a partial run of all of these journals, although one, *Current Opinion in Structural Biology*, appears among the unavailable titles because Wooster's subscription to it began after the period covered by the Biochemistry textbook. The 60 unavailable titles represent only 199 citations out of the 1682 collected (12 percent), with thirty-eight of the unavailable journals cited only one time. Only four of the unavailable titles, plus three additional titles which are available at other CONSORT libraries but not at Wooster, were cited ten or more times. Of these titles, *Current Opinion in Structural Biology* has already been added to the College of Wooster collection as noted above. The other titles, *Advances in Inorganic Chemistry and Radiochemistry, American Laboratory, Annual Review of Cell Biology, The Biochemical Journal, Biochimica et Biophysica Acta,* and *Chemical and Engineering News*, could be examined as possible candidates for addition to the collection.

CHAPTER V. SUMMARY AND CONCLUSIONS

This study yields several observations regarding the College of Wooster's chemistry collection. The large monograph collection gives reasonably good access to materials to supplement all the course textbooks analyzed. Wooster also possesses an extensive journal collection that includes most titles referenced with any frequency. Only six titles referenced more than ten times do not appear in the Wooster library. One problem with the journal collection is the existence of incomplete runs of several frequently cited journal titles, notably *The Journal of Chemical Education,* but also *Nature, Inorganic Chemistry,* and *The Journal of Biological Chemistry* among the top ten titles.

When access to materials from off-campus sources is considered, almost any monograph cited can be acquired. Both the Five Colleges Consortium and OhioLINK permit borrowing of these materials from participating campuses by document delivery, without charge. Requests are made directly from the CONSORT or OhioLINK Web pages, so students need go to the library building only to pick up their materials. Such electronic browsability and ease of access are two of the most powerful features of the Web-based catalogs prevalent today.

At this time, remote access to journal materials is more problematical. Since journal volumes do not circulate, the type of resource sharing described above does not apply. Copies of articles can be obtained from fee-based systems by document delivery, but if cost is a consideration a trip to a nearby library may be more efficient than multiple article delivery. The online catalog can be used to ensure that the desired volumes are held by the library to be visited before the trip is begun.

Several questions remain unanswered at the conclusion of this study. One is the actual availability of the materials cited, as opposed to their theoretical availability. This study focused on whether the catalog said the library owned a book or journal. No attempt was made to quantify the proportion of owned materials that were actually on the shelves at any given time rather than being in circulation, on a carrel shelf or library table, or missing for other reasons.

A second, and crucial, unanswered question is that of whether the students ever look up any of the works cited in their textbooks at all. Educators value textbooks more highly for their references; indeed one professor at Wooster stated that the extent of the supplementary reading lists had been a major factor in the decision to purchase a particular textbook. The authors' opinion that a work is worthy of being referred to constitutes an endorsement of its quality, but if the students never read the work, does it form a valuable part of the library collection? A usage study to evaluate the ways in which the collection is actually used may prove very valuable.

The lists of cited materials obtained in the course of this study may be useful as a tool for collection enrichment. By examining the items that were cited but not owned, possible titles to be added to the collection may be determined. The textbook citation method does not yield information on the most up-to-date works available due to the time lag inherent in textbook publication. Even the most recent textbook, *Physical Chemistry* (published in 1996) cited references only up to 1994. However, slightly older works of potential value can be identified in this manner. Journal subscription and cancellation decisions can benefit from citation information as well, in that if a journal receives many citations it may be considered for purchase, or conversely for cancellation if it receives

none. However, textbook citation data can only serve as an adjunct source of information. The commitment to such a continuing purchase involves many other factors!

Table 1. Textbooks With And Without Citations

Course Number and Title	Year Taken	Type of Student	Textbook Author and Title	Citations Present?
101, 102. Introductory College Chemistry I, Introductory College Chemistry II	1	Mixed majors and non-majors	William L. Masterton and Cecile N. Hurley, *Chemistry: Principles and Reactions* 3rd ed. (New York: Saunders, 1997).*	No
			Theodore L. Brown, H. Eugene LeMay, Jr., and Bruce E. Bursten, *Chemistry: The Central Science* 5th ed. (Englewood Cliffs, NJ: Prentice Hall, 1991).	Yes
			William L. Masterson, Emil J. Slowinski and Conrad L. Stanitsky, *Chemical Principles* 5th ed. (Philadelphia: Saunders, 1977).	No
Introductory level text covering some material from 101, 102, 211, 212, 333, 334; no exact equivalent	Not required	Mixed majors and non-majors	John McMurry and Mary E. Castellion, *Fundamentals of General, Organic and Biological Chemistry* (Englewood Cliffs, NJ: Prentice Hall, 1992).	No
201. The Role Of Science And The Scientist In Society	Not required	Non-majors	Jacob Bronowski, *The Ascent of Man* (Boston: Little, Brown and Co., 1973).*	No
			Buell and Girard, *Chemistry: an Environmental Approach.**	No
211, 212. Organic Chemistry I, Organic Chemistry II	2	Mixed majors and non-majors	L. G. Wade, Jr., *Organic Chemistry* 3rd ed. (Upper Saddle River, NJ: Prentice Hall, 1995).*	No
			Daniel S. Kemp and Frank Vellaccio, *Organic Chemistry* (New York: Worth, 1980).	Yes
			Francis A. Carey, *Organic Chemistry* 2nd ed. (New York: McGraw-Hill, 1992).	No
215. Analytical Chemistry	2 or 3	Majors	Daniel C. Harris, *Quantitative Chemical Analysis* 4th ed. (New York: Freeman, 1995).*	Yes
318, 319. Physical Chemistry I, Physical Chemistry II	3 or 4	Majors	Gordon M. Barrow, *Physical Chemistry* 6th ed. (New York: McGraw-Hill, 1996).*	Yes
			P. W. Atkins, *Physical Chemistry* 2nd ed. (New York: Freeman, 1978).	Yes
333, 334. Biochemistry I, Biochemistry II	3 or 4	Majors	Donald Voet and Judith G. Voet, *Biochemistry* 2nd ed. (New York: Wiley, 1995).*	Yes
340. Inorganic Chemistry	3 or 4	Majors	F. Albert Cotton, Geoffrey Wilkinson and Paul L. Gaus, *Basic Inorganic Chemistry* 3rd ed. (New York: Wiley, 1995).*	Yes
313. Advanced Organic Chemistry	3 or 4	Majors	Francis A. Carey and Richard J. Sundberg, *Advanced Organic Chemistry, Part A: Structure and Mechanisms* 2nd ed. (New York: Plenum, 1984).	Yes
			Francis A. Carey and Richard J. Sundberg, *Advanced Organic Chemistry, Part B: Reactions and Synthesis* 2nd ed. (New York: Plenum, 1983).	Yes
			Stuart Warren, *Organic Synthesis: The Disconnection Approach* (New York: Wiley, 1982).	Yes

* Indicates textbooks included in this study.

Table 2. Summary Of Monograph And Journal Data

	Gross # Citations	# Held at COW	% Held at COW	# Held by CONSORT	% Held by CONSORT	# Held by OhioLINK	% Held by OhioLINK	# Un-available	% Un-available
Monographs - total	824	397	48%	151	18%	221	27%	55	7%
Analytical Chemistry	59	30	51%	11	19%	12	20%	6	10%
Biochemistry	226	87	38%	51	23%	81	36%	7	3%
Inorganic Chemistry	310	132	43%	57	18%	92	30%	29	9%
Organic Chemistry	36	36	100%	0	0%	0	0%	0	0%
Physical Chemistry	139	77	55%	24	17%	27	19%	11	8%
Science and Society	54	35	65%	8	15%	9	17%	2	4%
Category	**Gross # Citations**	**# Held at COW**	**% Held at COW**	**# Held by CONSORT**	**% Held by CONSORT**	**# Un-available**	**% Un-available**		
Journals - Total	1682	1102	66%	330	20%	250	15%		
Analytical Chemistry	361	208	58%	117	32%	36	10%		
Biochemistry	1005	709	71%	88	9%	208	21%		
Inorganic Chemistry	213	171	80%	36	17%	6	3%		
Organic Chemistry	0								
Physical Chemistry	103	14	14%	89	86%	0	0%		
Science and Society	0								

Table 3. Journal Titles And Availability

Journal Titles Available at the College of Wooster		Journal Titles Available at a CONSORT Library	Unavailable Journal Titles	
Acc Chem Res†	*Fed Proc*	*Adv Enzymol Relat Areas Mol Biol*	*Acta Physiol Scand*	*J Biochem*
Acta Cryst†	*Inorg Chem*†	*Adv Human Genet*	*Adv Biophys*	*J Bioenerg Biomembr*
Adv Enzymol	*Inorg Chim Acta Rev*	*Adv Inorg Chem Radiochem*	*Adv Cell Biol*	*J Bioeng Biomembr*
Adv Inorg Chem	*Int Rev Cytology*	*Am J Physiol*	*Adv Enzyme Reg*	*J Clin Invest*
Adv Organomet Chem	*J Am Chem Soc*†	*Annu Rev Cell Biol*	*Am Biotech Lab*	*J Dent Res*
Adv Phys Org Chem	*J Bacteriol*	*Annu Rev Med*	*Am Lab*	*J Invest Dermatol*
Adv Protein Chem	*J Biol Chem*†	*Annu Rev Plant Physiol*	*Amino Acids and Peptides (annual series)*	*J Less-Common Met*
Am Scientist	*J Cell Biol*	*BioEssays*	*Anal Biochem*	*J Membr Biol*
Anal Chem	*J Cell Sci*	*Chem Ber*	*Angew Chem*	*J Water Pollution Control Federation*
Anal Chim Acta	*J Chem Ed*†	*Chem Eng News*†	*Ann NY Acad Sci*†	*Methods*
Analyst	*J Chem Phys*	*Chem Ind*	*Biochem J*	*Nucleic Acids Res*
Angew Chem Int Ed Eng	*J Chem Soc*†	*Curr Top Microbiol Immunol*	*Biochem Soc Trans*	*Perspect Biol Med*
Annu Rev Biochem	*J Chem Soc Chem Commun*	*J Phys E: Sci Instrum*	*Biochim Biophys Acta*	*Phil Trans R Soc London Ser B*
Annu Rev Biophys Bioeng	*J Chem Soc Dalton Trans*	*J Res Natl Inst Stand Technol*	*Biochimie*	*Proc Royal Soc London Ser B*
Annu Rev Biophys Biomol Struct	*J Chromatog*	*Lancet*	*Biol Chem*	*Prog Biophys Mol Biol*
Annu Rev Biophys Biophys Chem	*J Chromatogr Sci*	*Nature Struct Biol*	*Biometrika*	*Pure Appl Chem*†
Annu Rev Genet	*J Mol Biol*	*Physiol Rev*	*Biopolymers*	*Q Rev Biophys*
Annu Rev Physiol	*J Phys Chem*		*Biosci Rep*	*Rev Physiol Biochem Pharmacol*
Annu Rev Plant Physiol Plant Mol Biol	*J Res National Bureau of Standards*		*Biotechnology*	*Sem Hematol*
Biochemistry†	*Methods Enzymol*		*Blood*	*Structure*
Bioorganic Chemistry	*Nature*†		*Br Med Bull*	*Trends Cell Biol*
Bull Chem Soc Japan	*N Engl J Med*		*Can J Phys*	*Trends Neurosci*
Can J Chem	*Organometallics*		*Clin Biochem*	*Trends Pharm Sci*
Cell	*Polyhedron*		*Clin Sci*	
Chem Br†	*Proc Natl Acad Sci*		*CRC Crit Rev Biochem*	
Chem Rev†	*Prog Inorg Chem*		*Curr Opin Biotech*	
Chem Soc Rev	*Prog Nucleic Acid Res Mol Biol*		*Curr Opin Cell Biol*	
Chemtech	*Protein Sci*		*Curr Opin Struct Biol*	
Cold Spring Harbor Symp Quant Biol	*Proteins*		*Curr Top Bioeng*	
Coord Chem Rev	*Q Rev*		*Curr Top Cell Reg*	
Crit Rev Biochem Mol Biol	*Sci Am*†		*Electrochim Acta*	
Curr Top Bioenerg	*Science*†		*Eur J Biochem*	
Curr Top Membr Transp	*Struct Bonding*		*FEBS Lett*	
EMBO J	*Talanta*		*Fresenius J Anal Chem*	
Endeavour	*Transition Metal Chem*		*Interdiscip Sci Rev*	
Essays Biochem	*Trends Biochem Sci*		*International Critical Tables*	
FASEB J	*Trends Genet*		*J Anal Chem USSR*	

† Indicates journals cited in more than one textbook.

Table 4. Ten Most-Cited Journal Titles

Abbreviated Journal Title	# Citations Available at the College of Wooster	# Citations Available at CONSORT Libraries	# Un-available Citations	Total # Citations	% Citations	Cumulated % of Total Citations
J Chem Ed	47	204	0	251	15%	15%
Anal Chem	114	0	0	114	7%	22%
Science	102	0	0	102	6%	28%
Nature	60	37	0	97	6%	34%
Annu Rev Biochem	95	0	0	95	6%	39%
Trends Biochem Sci	60	0	31	91	5%	45%
Curr Opin Struct Biol	0	0	59	59	4%	48%
Inorg Chem	51	5	0	56	3%	51%
Sci Am	55	0	0	55	3%	55%
J Biol Chem	50	1	0	51	3%	58%

APPENDIX A.
Chemistry Courses Offered at the College of Wooster in 1997-98 and their Required Reading Material

Course	Textbook(s) Required
101, 102. Introductory College Chemistry I, Introductory College Chemistry II	William L. Masterton and Cecile N. Hurley, *Chemistry: Principles and Reactions* 3rd ed. (New York: Saunders, 1997)
201. The Role Of Science And The Scientist In Society	Jacob Bronowski, *The Ascent of Man* (Boston: Little, Brown and Co., 1973) Buell and Girard, *Chemistry: an Environmental Approach* Course Readings list
211, 212. Organic Chemistry I, Organic Chemistry II	L. G. Wade, Jr. *Organic Chemistry* 3rd ed. (Upper Saddle River, NJ: Prentice Hall, 1995) Course Laboratory Syllabus
215. Analytical Chemistry	Daniel C. Harris, *Quantitative Chemical Analysis* 4th ed. (New York: Freeman, 1995)
313. Advanced Organic Chemistry	None available
318, 319. Physical Chemistry I, Physical Chemistry II	Gordon M. Barrow, *Physical Chemistry* 6th ed. (New York: McGraw-Hill, 1996)
333, 334. Biochemistry I, Biochemistry II	Donald Voet and Judith G. Voet, *Biochemistry* 2nd ed. (New York: Wiley, 1995)
340. Inorganic Chemistry	F. Albert Cotton, Geoffrey Wilkinson and Paul L. Gaus, *Basic Inorganic Chemistry* 3rd ed. (New York: Wiley, 1995)
401. Introduction To Independent Study	None available

APPENDIX B.
Sample Tabulation Sheets (Excel Spreadsheet)

Monographs:

Course	Author(s)	Monograph Title	Publisher	Date	Held at the College of Wooster?	Held by a CONSORT library?	Available via OhioLINK?

Journals:

Course	Journal Title	Date	Held at the College of Wooster?	Held by a CONSORT library?

ENDNOTES

[1] Sharon L. Baker and F. Wilfrid Lancaster, *The Measurement and Evaluation of Library Services* 2nd. ed. (Arlington, VA: Information Resources Press, 1991), 39-142.

[2] Shirley A. Kelley, "A Comparison of Methods for Evaluating Curricular Support: Two Studies," *The Christian Librarian* 39, no. 1 (1996): 18-22.

[3] Frances Davis, "A Plan for Evaluating a Small Library Collection," *C&RL News* 6 (June 1993): 328-9.

[4] Kate Bradley, "Science Collections in Community College Libraries," *C&RL News* (July/August 1989): 579-82.

[5] Baker and Lancaster, 47.

[6] Ibid., 54.

[7] Danny P. Wallace, "Bibliometrics and Citation Analysis," in *Principles and Applications of Information Science for Library Professionals*, ed. John N, Olsgaard (Chicago: ALA 1989), 23.

[8] Robert J. Greene, "Computer Analysis of Local Citation Information in Collection Management," *Collection Management* 17, no. 4 (1993): 11-24.

[9] Bill Johnson, "Citation Analysis of the Texas Tech University's Statistics Faculty: A Study Applied to Collection Development at the University Library," *LIBRIS* 6, no. 3 (September 1996): 21959 bytes.

[10] Ibid.

[11] Robert N. Bland, "The College Textbook as a Tool For Collection Evaluation, Analysis, and Retrospective Collection Development," *Library Acquisitions: Practice and Theory* 4 (1980): 193-7.

[12] Roger E. Stelk and F. Wilfrid Lancaster, "The Use of Textbooks in Evaluating the Collection of an Undergraduate Library," *Library Acquisitions: Practice and Theory* 14 (1990): 191-3.

[13] William W. Currie, "Evaluating the Collection of a Two-Year Branch Campus by Using Textbook Citations," *Community and Junior College Libraries* 6, no. 2 (1989): 75-9.

[14] E. J. Wainwright and J. E. Dean. *Measures of Adequacy for Library Collections in Australian Colleges of Advanced Education* (Perth: Western Australian Institute of Technology, 1977), 2 vol.

[15] Roger E. Stelk and F. Wilfrid Lancaster, 192.

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Wainwright, E. J. and J. E. Dean. *Measures of Adequacy for Library Collections in Australian Colleges of Advanced Education*. Perth: Western Australian Institute of Technology, 1977.

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