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Circulation and Its Relationship to the Book Collection and Academic Departments

The computer-produced circulation statistics in the Bucknell University Library for the academic year 1973/74 are analyzed by Library of Congress classification and academic department. Circulation is compared to the number of volumes related to each department in order to determine how much the department is using the subject-related book collection. Circulation is also compared with the number of students in the department. These two comparisons identify areas of the collection that are underutilized or heavily used. Those areas can be studied to determine why this is so and where additional resources should be placed or where the collection should be weeded.

How is the book collection being used? Which departments make use of it? Are we adding books to the collection that are useful? Are books important to certain disciplines? In an attempt to provide some insight into these questions, the circulation figures of the Ellen Clarke Bertrand Library of Bucknell University for 1973/74 were analyzed.

William E. McGrath, in one study, indicated the correlation between books charged out and books used within an open-stack library.[1] We have considered only those books actually charged out. In another study McGrath assigned classification numbers to courses and found that book numbers matching course profiles were more likely to be charged out than not.[2] The Bucknell case study focuses on individual departments and

indicates which departments are well served.

Bucknell University is primarily an undergraduate university of about 3,000 students in a rural area of central Pennsylvania with an open-stack library. It has thirty-three departments or programs. Programs have a somewhat different status than departments, but for our purposes the distinction is irrelevant. The Library of Congress Classification is used by the library, and each department or program was assigned a class or classes corresponding to the subject matter. This is routinely done in order to produce a list of new books on a departmental basis. Statistics are collected by the computer through an online circulation system.

There are a few problems due to the LC classification system and programming of the computer. For instance, the computer science and mathematics classification cannot be separated, since the computer programming does not break

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down class QA into subclassifications. The economics books and the management books are not separable because it is difficult to divide class H into economics and management classifications. There are four engineering departments in the College of Engineering—chemical, civil, electrical, and mechanical—but we have not subdivided class T. Japanese studies include many books in history, but we have not subdivided history, so we have a figure for history and a figure for Japanese studies and history, which includes the language material, but no separate figure for Japanese studies alone. The miscellaneous figure includes the unmodified H's and K's due to a programming error, so that the sociology and political science figures will be a little off.

Also noted are the classifications that do not fall into any of Bucknell's disciplines. These are: A, General; Q, General Science; V, Naval Science; Z, Bibliography and Information Science; Juvenile, classified in Dewey; New Book Shelf, which are unclassified until LC copy is received, and Paperbacks.

In order to determine the number of books in each classification, the shelflist was measured, and the figure of 120 volumes to each inch of cards was used to calculate the number of volumes. This figure may possibly be inaccurate because some areas will have more multivolume sets or additional copies than other areas. It may also be inaccurate because the 120-volume figure is an estimate. However, for our purposes the actual figure is not so important, since it is the relationship of one area to another that concerns us.

The circulation figures were computed to show the percentage of total circulation by department as compared with the number of books by department. The figures do not include reserve books, periodicals, or government documents. Calculations were also made to

TABLE 1

ACADEMIC DEPARTMENTS AND LC CLASSIFICATION AS RELATED TO LIBRARY CIRCULATION, BUCKNELL UNIVERSITY, 1973–74

1 Department and Class Numbers	2 Volumes	3 Circulation (Total = 67,307)	4 Percent of Collection*	5 Percent of Circulation†	6 Ratio of 5 to 4	7 Percent of Total Circulation
Art: N	9,240	3,226	3.49	4.79	137.25	4.48
Astronomy: QB	960	111	.36	.16	44.44	.15
Biology: QH–S	17,040	6,473	6.44	9.62	149.38	8.98
Chemistry: QD	2,640	750	1.0	1.11	111.0	1.04
Classics: PA	3,000	985	1.13	1.46	129.2	1.37
Computer Science and Mathematics: QA	7,320	1,172	2.77	1.74	62.82	1.63
Economics and Management: HA–HJ	24,360	4,529	9.21	6.73	73.07	6.28
Education: L	9,960	2,412	3.77	3.58	94.96	3.35
Engineering: T	11,880	2,688	4.49	3.99	88.86	3.73
English: PN, PR–PS, PZ	40,080	12,530	15.0	18.62	122.9	17.38
Geology and						

Geography: G–GF, QE	4,440	631	1.68	.94	55.95	.88
Geography: G–GF	2,040	252	.77	.37	48.05	.35
Geology: QE	2,400	379	.91	.56	61.54	.53
History: C–F	46,800	9,522	17.7	14.15	79.94	13.21
Japanese Studies and History: C–F, PJ–PM	48,480	9,914	18.33	14.73	80.36	13.75
Management and Economics: HA–HJ	24,360	4,529	9.21	6.73	73.07	6.28
Mathematics and Computer Science: QA	7,320	1,172	2.77	1.74	62.82	1.63
Military Science: U	1,320	322	.5	.48	96.0	.45
Modern Languages Literatures, and Linguistics: P, PB–PH, PA, PT	22,080	4,088	8.35	6.07	72.69	5.67
French: PQ1–PQ3999	7,680	1,598	2.9	2.37	81.72	2.22
German: PT	5,160	987	1.95	1.47	75.38	1.37
Linguistics: P	1,320	415	.5	.62	124.0	.58
Russian: PG	2,520	454	.95	.67	70.53	.63
Spanish: PQ6001–PQ9999	1,680	583	.64	.87	135.94	.81
Music: M	5,040	1,462	1.91	2.17	113.61	2.03
Philosophy: B–BD, BH–BJ	7,320	1,767	2.77	2.63	94.95	2.45
Physical Education: GV	1,080	503	.41	.75	182.93	.7
Physics: QC	3,840	700	1.45	1.04	71.72	.97
Political Science: HX–K	13,800	2,784	5.22	4.14	79.31	3.86
Psychology: BF	4,200	2,694	1.59	3.95	248.43	3.74
Religion: BL–BX	14,760	2,656	5.58	3.95	70.79	3.68
Sociology: GN–GT, HM–HV	11,640	4,910	4.4	7.29	165.68	6.81
	(Total = 72,078)					93.38
			(Total Collection)		(7 to 4)	
General: A	1,080	48	.41		17.5	.07
General Science: Q	2,040	199	.75		37.33	.28
Naval Science: V	360	37	.13		38.46	.05
Bibliography and Information Science: Z	2,040	161	.75		29.33	.22
Juvenile	2,160	534	.79		93.67	.74
New Book Shelf		1,199				1.66
Paperbacks		1,872				2.6
Miscellaneous		721				1.0

° Excluding A, Q, V, Z, Juvenile, New Book Shelf, Paperbacks
† Excluding A, Q, V, Z, Juvenile, New Book Shelf, Paperbacks, Miscellaneous

show the percentage of the total circulation in order to make a comparison with the percentage of nondepartmental circulation.

Since the circulation figures are by class number, there is not the distortion which might come about if one used as a basis the amount spent on books or the number of volumes requested by a department regardless of where they might be classified. However, these factors are of some significance and deserve study.

ACADEMIC DEPARTMENTS AND LIBRARY CIRCULATION

Table 1 lists the departments and LC class related numbers. Some departments are listed twice because of combined figures that cannot be separated, e.g., economics and management. Geology and geography are combined into one department administratively, but this is historical accident. The five programs under modern languages, literatures, and linguistics are all programs within one department.

The second column gives the number of volumes (estimated) in the class numbers related to the department. The third column gives the circulation of books in those class numbers. The fourth column lists the percentage of books in those class numbers as a portion of the total book collection, excluding books not related to any department. The fifth column lists the percentage of circulation of those books in relationship to the total circulation, excluding books not related to any department. The sixth column shows the relationship between books circulated and books in the collection. The last column lists the percentage of circulation of books in relationship to the total circulation. (The percentage figures are rounded off to the nearest hundredth.)

The sixth column in Table 1 contains significant figures as they indicate whether the collection is being used and which disciplines are making the most use of the collection. Any figure above 100 means that the percentage of circulation is higher than the percentage of books in that class. Therefore, the higher the number the greater the use compared to other classes. The nondepartmental figures given in this column show the relationship to the total circulation.

NUMBER OF STUDENTS AND LIBRARY CIRCULATION

Table 2 again lists departments and LC class numbers and percentage of circulation. The second column gives the total number of students who received grades in the departments' courses for the two semesters and summer school. The last column shows the relationship of circulation to grades as a percentage figure. The figure has no meaning by itself but serves to compare departments on the basis of number of students and circulation of books.

RANKING OF DEPARTMENTS

Table 3 first ranks the departments in order of highest circulation compared to the department's portion of the collection in order to show which departments make the most use of that part of the collection relating to their disciplines. The figures simply indicate that those departments at the top of the list use their parts of the collection more than do the departments at the bottom. Missing factors include number of faculty, number of charges for the same title, reserve book use, use of the periodicals collection, graduate work offered, need for a wide range of titles, and use of books outside one's discipline. We hope that much of the latter is occurring.

The last column in Table 3 compares circulation with the number of students taking a department's courses. By using both these relationships we learn some-

thing of the use of the collection and where our strengths and weaknesses lie. There are eleven departments that ranked below 100 compared to both number of volumes and number of students. If a department is low in both columns, we should look more closely at the collection to see why we are buying and keeping books that are not being used.

We should look at those collections which are used more heavily and see why, and if the higher circulation is for a few titles or for many. We can program our computer to retrieve other statistics that would be useful; for instance, a breakdown of circulation by student class and major.

Let us look at two cases. The physical education department accounts for a heavy proportion of grades given, and the collection is used heavily in relation

TABLE 2

ACADEMIC DEPARTMENTS AND STUDENTS AS RELATED TO LIBRARY CIRCULATION, BUCKNELL UNIVERSITY, 1973–74

1 Department and Class Numbers	2 Number of Grades (Total = 25,325)	3 Percent of Total Grades	4 Percent of Circulation*	5 Ratio of 4 to 3
Art: N	1,012	4.0	4.79	119.75
Astronomy: QB	79	.31	.16	51.61
Biology: QH–S	1,510	5.96	9.62	161.41
Chemistry: QD	1,176	4.64	1.11	23.92
Classics: PA	139	.55	1.46	265.45
Computer Science	—	—	—	—
Economics and Management: HA–HJ	3,075	12.14	6.73	55.44
Education: L	1,418	5.6	3.58	63.93
Engineering: T	1,768	6.98	3.99	57.16
English: PN, PR–PS, PZ	2,491	9.84	18.62	189.23
Geology and Geography: G–GF, QE	500	1.97	.94	47.72
Geography: G–GF	259	1.02	.37	37.27
Geology: QE	241	.95	.56	58.95
History: C–F	775	3.06	14.15	462.42
Japanese Studies and History: C–F, PJ–PM	1,052	4.15	14.73	354.94
Management and Economics: HA–HJ	3,075	12.14	6.73	55.44
Mathematics: QA	2,230	8.81	1.74	19.75
Military Science: U	74	.29	.48	165.52

Modern Languages, Literatures
   and Linguistics: P, PB–PH,
   PQ, PT
	995	3.93	6.07	154.45

French: PQ1–PQ3999	371	1.46	2.37	162.33
German: PT	259	1.02	1.47	144.12
Linguistics: P	73	.29	.62	213.79
Russian: PG	68	.27	.67	248.15
Spanish: PQ6001–PQ9999	207	.82	.87	106.1
Music: M	787	3.11	2.17	69.77
Philosophy: B–BD, BH–BJ	677	2.67	2.63	98.5
Physical Education: GV	1,600	6.32	.75	11.87
Physics: QC	715	2.82	1.04	36.88
Political Science: HX–K	923	3.64	4.14	113.74
Psychology: BF	1,480	5.84	3.95	67.64
Religion: BL–BX	350	1.38	3.95	286.23
Sociology: GN–GT, HM–HV	1,274	5.03	7.29	144.93

* Excluding A, Q, V, Z, Juvenile, New Book Shelf, Paperbacks, Miscellaneous

TABLE 3

RANKING OF DEPARTMENTS, RELATING COLLECTION USAGE TO NUMBER OF BOOKS
AND NUMBER OF STUDENTS, BUCKNELL UNIVERSITY, 1973–74

Department and Class Numbers	Usage of Collection Compared to Number of Books	Compared to Number of Students
Psychology: BF	248.43	67.64
Physical Education: GV	182.93	11.87
Sociology: GN–GT, HM–HV	165.68	144.93
Biology: QH–S	149.38	161.41
Art: N	137.25	119.75
Spanish: PQ6001–PQ9999	135.94	106.1
Classics: PA	129.2	265.45
Linguistics: P	124.0	213.79
English: PN, PR–PS, PZ	122.9	189.23
Music: M	113.61	69.77
Chemistry: QD	111.0	23.92
Military Science: U	96.0	165.52
Education: L	94.96	63.93
Philosophy: B–BD, BH–BJ	94.95	98.5
Engineering: T	88.86	57.16
French: PQ1–PQ3999	81.72	162.33
Japanese Studies and History: C–F, PJ–PM	80.36	354.94
History: C–F	79.94	462.42
Political Science: HX–K	79.31	113.74
German: PT	75.38	144.12
Economics and Management: HA–HJ	73.07	55.44
Management and Economics: HA–HJ	73.07	55.44
Modern Languages, Literatures and Linguistics: P, PB–PH, PQ, PT	72.69	154.45
Physics: QC	71.72	36.88
Religion: BL–BX	70.79	286.23
Russian: PG	70.53	248.15
Computer Science and Mathematics: QA	62.82	—
Mathematics and Computer Science: QA	62.82	19.75
Geology: QE	61.54	58.95
Geology and Geography: G–GF, QE	55.95	47.72
Geography: G–GF	48.05	36.27
Astronomy: QB	44.44	51.61
Juvenile	93.67	
Naval Science: V	38.46	
General Science: Q	37.33	
Bibliography and Information Science: Z	29.33	
General: A	17.5	

to its size but not in relation to the number of students. Probably the collection is too small, and the low usage compared to grades given would rise if the collection were larger. We also need to know who is using these books: our students or local high school students. The geography collection is used very little; only about 12 percent of the books circulate. It also ranks low in comparison with the number of students. The students may be using other books, such as those in history, since geography draws on many other disciplines. But in any case, most books in G–GF are not being read by anyone.

COLLEGE AND DIVISION AND LIBRARY CIRCULATION

The College of Arts and Sciences is organized along the divisional lines shown in Tables 4 and 5. These tables, showing data similar to those reported by department in Tables 1 and 2, reveal what we had thought: students in the humanities and fine arts read more and read more widely than do those in the social and natural sciences.

No formulas, magic or otherwise, result from this study. The figures represent no absolutes. We cannot say that a portion of the collection which has only a 72.69 percent ratio of usage is under-

TABLE 4

COLLEGE AND DIVISION AS RELATED TO LIBRARY CIRCULATION, BUCKNELL UNIVERSITY, 1973–74

1 Category	2 Volumes	3 Circulation	4 Percent of Collection°	5 Percent of Circulation†	6 Ratio of 5 to 4
College of Arts and Sciences	252,600	64,619	95.51	96.01	100.52
College of Engineering	11,880	2,688	4.49	3.99	88.86
College of Arts and Sciences					
Division of Humanities and Fine Arts (Art; Classics; English; History; Music; Modern Languages, Literatures, and Linguistics; Philosophy; Religion; Japanese Studies)	150,000	36,628	(Percent of A & S) 59.38	(Percent of A & S) 56.68	95.45
Division of Social Sciences (Economics, Education, Political Science, Psychology, Sociology, Management)	63,960	17,329	25.32	26.82	105.92
Division of Natural Sciences and Mathematics (Biology, Chemistry, Geology and Geography, Mathematics, Physics)	35,280	9,726	13.97	15.05	107.73
Division of Special Programs (Military Science, Physical Education)	2,400	825	.95	1.28	134.74

° Excluding A Q, V, Z, Juvenile, New Book Shelf, Paperbacks
† Excluding A, Q, V, Z, Juvenile, New Book Shelf, Paperbacks, Miscellaneous

TABLE 5

COLLEGE AND DIVISION AND STUDENTS AS RELATED TO LIBRARY CIRCULATION, BUCKNELL UNIVERSITY, 1973–74

1 Category	2 Number of Grades	3 Percent of Total Grades	4 Percent of Circulation°	5 Ratio of 4 to 3
College of Arts and Sciences	23,557	93.02	96.01	103.21
College of Engineering	1,768	6.98	3.99	57.16
College of Arts and Sciences				
Division of Humanities and Fine Arts (Art; Classics; English; History; Music; Modern Languages, Literatures, and Linguistics; Philosophy; Religion; Japanese Studies)	7,503	(Percent of A & S) 31.85	(Percent of A & S) 56.68	177.96
Division of Social Sciences (Economics, Education, Political Science, Psychology, Sociology, Management)	8,170	34.68	26.82	77.34

TABLE 5 (continued)

1 Category	2 Number of Grades	3 Percent of Total Grades	4 Percent of Circulation*	5 Ratio of 4 to 3
Division of Natural Sciences and Mathematics (Biology, Chemistry, Geology and Geography, Mathematics, Physics)	6,210	26.36	15.05	57.09
Division of Special Programs (Military Science, Physical Education)	1,674	7.11	1.28	18.0

* Excluding A, Q, V, Z, Juvenile, New Book Shelf, Paperbacks, Miscellaneous

used and those above this figure are adequately used. The ratios indicate relationships. We need to examine those areas that are heavily used to see why this is so. A low usage may mean that our collection does not have the titles needed. Perhaps we should check certain classifications against bibliographies. Perhaps some areas rely more on periodicals than books and we should adjust our purchases accordingly. Certain areas of the collection must be examined as to selection, usage, and funding in order to make a more efficient use of the collection. All of this should be done anyway, but we now know where to start.

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