

# Proving the Value of Library Collections Part II: An Interdisciplinary Study Using Citation Analysis

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Amalia Monroe-Gulick and Lea Hill Currie, "Proving the Value of Library Collections Part II: An Interdisciplinary Study Using Citation Analysis" (2013). *Proceedings of the Charleston Library Conference*.  
<http://dx.doi.org/10.5703/1288284315284>

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# Proving the Value of Library Collections Part II: An Interdisciplinary Study Using Citation Analysis

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## Abstract

At the 2012 Charleston Conference, University of Kansas (KU) librarians presented the results of a citation analysis project conducted using faculty publications in the sciences. Library administrators were excited by the findings reported from this analysis and compelled the librarians to proceed with more citation analysis research by supporting them with student assistants who helped gather the initial data that were used in the study. During the subsequent year, KU librarians took the collection assessment project two steps further by gathering citation data from faculty publications in the humanities and social sciences to conduct an extensive citation analysis.

Using a random sampling of faculty publications from three departments in the humanities: philosophy, art history, and English—and three departments in the social sciences—psychology, political science, and economics—the presenters conducted a citation analysis of the resources cited in faculty journal publications. The librarians used this new data to compare the two broad disciplinary areas with the sciences, but even more importantly, they collected data that would influence collection development decisions in the individual subject areas. The authors tested their assumptions, expecting to find that science faculty use more journals than books and humanities faculty use more books than journals, but in some cases, the results were unexpected.

## Introduction

Library administrators are constantly called upon to discuss budgetary issues with university administration and must prove the worth of the services and collections they supply. Academic libraries' large operating budgets are often viewed as excessive by university administrators when university budgets are cut, making libraries vulnerable. Even though library expenditures usually remain flat or decrease from year to year, they are constantly asked to prove their worth to university researchers.

The objective of this study was to prove the value of the University of Kansas (KU) Libraries by demonstrating that the Libraries provide access to the necessary resources that faculty use to conduct their research. Another objective was to find out if there are weaknesses in the library collections that could be corrected. Through a citation analysis project, the authors randomly sampled faculty from three departments in the sciences (physics, ecology, and evolutionary biology), three departments in the humanities

(English, art history, and philosophy), and three departments in the social sciences (psychology, political science, and economics). They used a random sample of the citations from these faculty's publications to analyze library access and ownership. Using this analysis, the authors were able to demonstrate the role libraries play by providing essential resources needed for faculty to be productive in research. The authors tested their assumptions that science faculty use more journal articles than books, humanities faculty use more books than journals, and social sciences faculty use more journal articles than books. Along with proving these assumptions, they also assumed that science and social sciences faculty use more current publications than faculty in the humanities. The authors also sought answers to the following questions:

1. What formats (books, journals, etc.) are used by faculty?
2. Are the cited items available electronically, in print, or both?

- |  |   |
|--|---|
| <ol style="list-style-type: none"> <li>3. What is the age of the cited items?</li> <li>4. How are the cited journals purchased? (In large journal packages, in aggregator databases, etc.)</li> <li>5. What are the most frequently cited publishers in these disciplines?</li> <li>6. Do citation patterns vary among the disciplines?</li> </ol> | <ol style="list-style-type: none"> <li>4. Call number</li> <li>5. KU availability</li> <li>6. Print access</li> <li>7. Electronic access</li> <li>8. Journal package access</li> <li>9. Aggregator database access</li> </ol> |
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## Methodology

To begin this project, the authors consulted the departmental web sites for the chosen disciplines to randomly select faculty. Student assistants downloaded the faculty's CVs and copied and pasted the list of citations in each of their publications into a spreadsheet. Journal articles published 2005 to the present were used as parameters for inclusion in the analysis. The sample size was different for each broad area because of the large variance in the number of citations for the broad subject areas. After randomizing the citations using Excel, the following sample sizes were used:

- Science citations: 15% (1,511 out of 10,294)
- Social Sciences citations: 36% (1,246 out of 3,463)
- Humanities citations: 59% (465 out of 784)
- Cumulative sample size: 22% (3,222 out of 14,541)

The science disciplines made up 47% of the total citations, the social sciences made up 39%, and the humanities represented 14% of the sample. After the samples from each department were identified, they were combined for the analysis. Each citation was analyzed to record the following data:

1. Publisher
2. Publication date
3. Format (journal article, book, report, etc.)

For the purpose of this study, the authors concentrated their analysis on books and journal articles. Each citation was searched in WorldCat to determine if the KU Libraries provided access to the title, and the data were recorded in Excel spreadsheets. Next, the authors analyzed the citations by broad subject disciplinary area and by specific department.

Several limitations were noted during the collection of the data. The authors had no way of knowing if the materials in the sample were accessible during the time the research was conducted by the faculty. They agreed that for the purpose of the study, currently available publications would be recorded as accessible. The authors were also concerned that the CVs found on departmental web sites may not have been current or complete. This could affect the results because analyzing older publications may not reflect the current research patterns of faculty, and it could also skew the results for the age of the publications.

## Results/Analysis

The analysis was conducted by grouping the departments under the broad subject disciplines. The following are the results by each department under the broad disciplinary areas: sciences, social sciences, and humanities.

### Sciences

#### *Ecology and Evolutionary Biology (EEB)*

From the 354 citations that were analyzed for EEB, 86% were provided by the KU Libraries. Twenty-four percent were available in print only, while

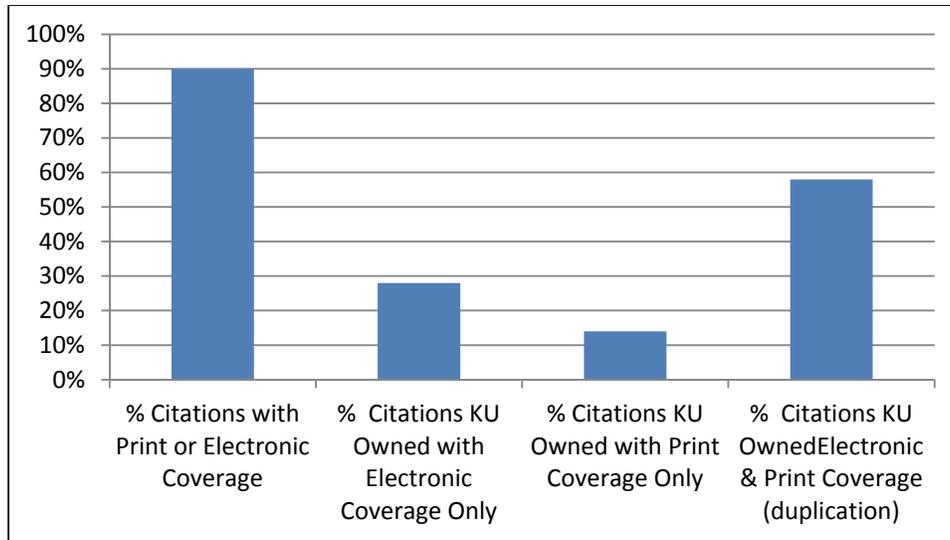


Figure 1. EEB Journals with KU Access (By Format)

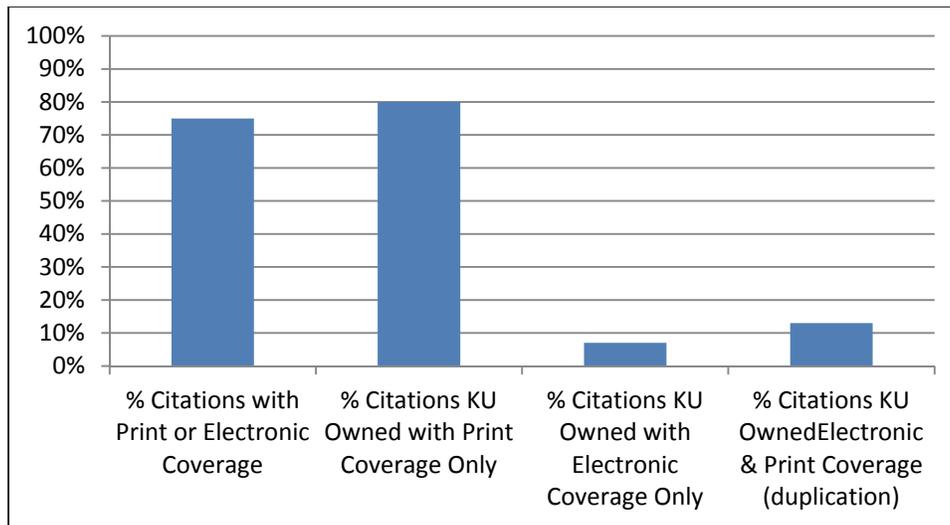


Figure 2. EEB Books with KU Access (By Format)

27% were available only in electronic format. Forty-nine percent were duplicated in print and electronic formats. Of the 14% of the citations that were not available through KU, 28% were books and 56% were journal articles.

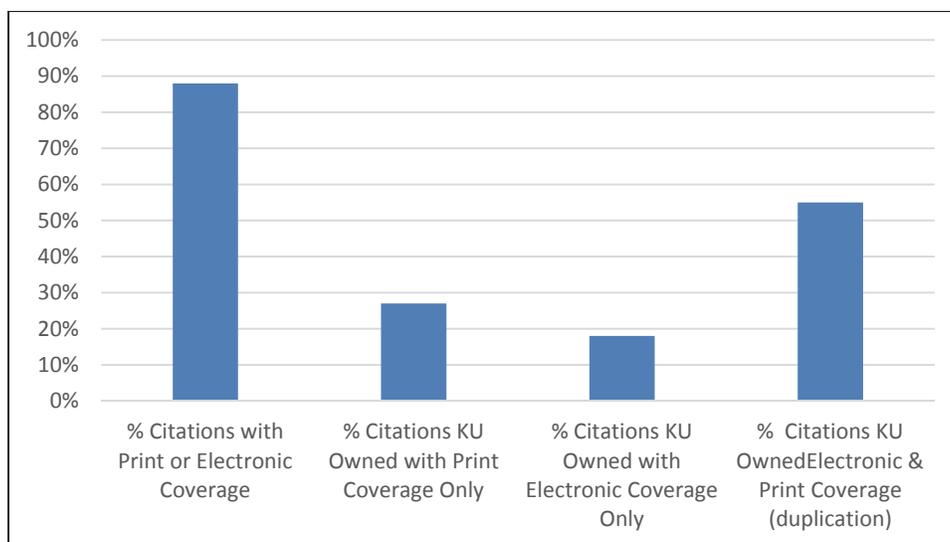
#### EEB Journals

Seventy-five percent of the citations in EEB were from journals. Ninety percent of these were available to KU researchers in print and/or electronic access (Figure 1). Twenty-eight percent were available only in electronic format, while 14% were available only in print. Fifty-eight percent of the citations were duplicated in both print and electronic formats. Seventy percent of the citations

were provided from large journal packages, while 50% were provided in aggregator databases. The top publishers in EEB were Wiley-Blackwell and Elsevier. Eighty-eight percent of the journals cited by EEB faculty were in the Q call number range. The average publication date was 1992.

#### EEB Books

Seventy-five percent of the books cited by EEB faculty were available in print and/or electronic format (Figure 2). Seven percent were e-books, while 80% were available only in print. Thirteen percent of the books were duplicated in print and electronic formats. The top publishers were Cambridge and Wiley-Blackwell. Ninety percent of



**Figure 3. Geology Journals with KU Access (By Format)**

the books citations could be found in the Q call number range. The average publication date was 1991.

### *Geology*

Out of the 493 citations analyzed for Geology, the library provided 82% of them. Thirty-three percent were available only in print, while 18% was available only in electronic format. Fifty percent of all the citations were duplicated in print and electronic formats. Of the 18% not owned by KU, 33% were books and 53% were journal articles.

#### Geology Journals

Eighty-two percent of the citations in Geology were from journals, and KU owned 88% (Figure 3). Eighteen percent were available electronically, while 27% could be found in print. Fifty-five percent were duplicated in print and electronic formats. Sixty-nine percent of the journals were provided in large journal packages, and 21% were in aggregator databases. The Geologic Society of America, Wiley-Blackwell, and Elsevier were the top publishers. Eighty-eight percent of the journals could be found in the Q call number range. The average publication date was 1990.

#### Geology Books

KU owned 55% of the books cited by Geology faculty. Fifty percent of those were in electronic

format, while 86% were in print (Figure 4). Eight percent could be found in print and electronic formats. There were no dominant publishers in Geology. Seventy-six percent of the books could be found in the Q call number range. The average publication date was 1990.

### *Physics*

Five hundred and forty-seven citations were analyzed in Physics, and, out of these, KU provided 87%. Twenty-five percent of the citations were for print only resources, while 36% were electronic. Thirty-nine percent were duplicated in print and electronic formats. Of the 13% items not owned by KU, 35% of them were books and 3% were journals.

#### Physics Journals

Seventy-four percent of the citations in Physics faculty publications were from journals. KU provided access to 95%. Thirty-nine percent were from electronic journals, while 12% were from print (Figure 5). Forty-nine percent were duplicated in print and electronic formats. Eighty-five percent of the titles could be found in large journal packages, and 21% were available in aggregator databases. Elsevier and the American Physical Society were the top two publishers. Ninety-four percent of the journals could be found in the Q call number range. The average publication date was 1996.

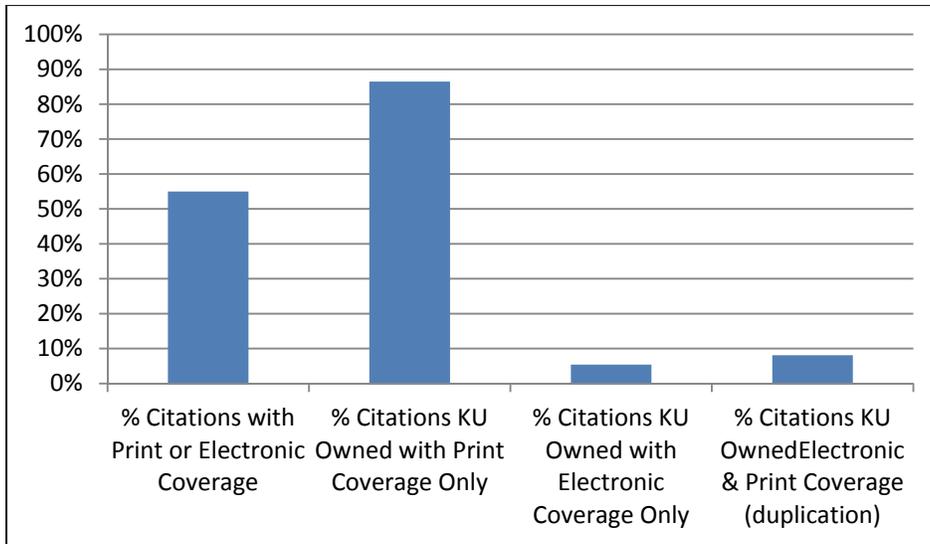


Figure 4. Geology Books with KU Access (By Format)

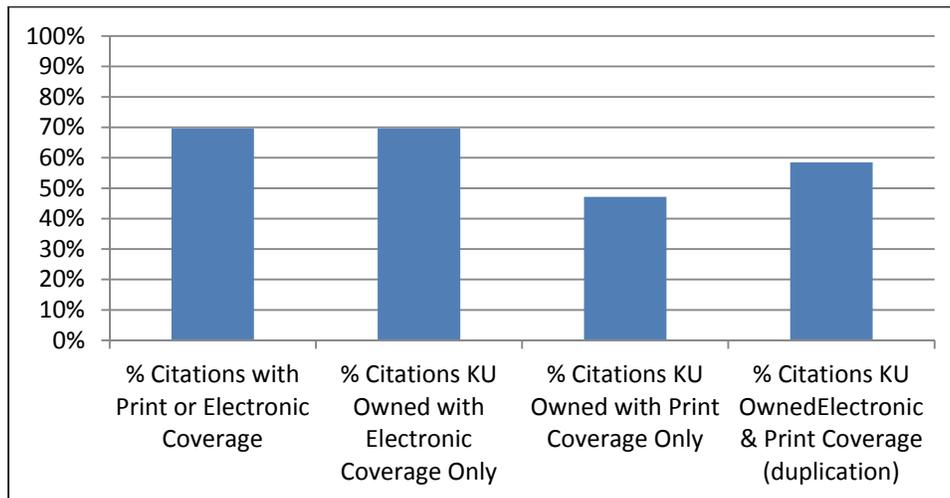


Figure 5. Physics Journals with KU Access (By Format)

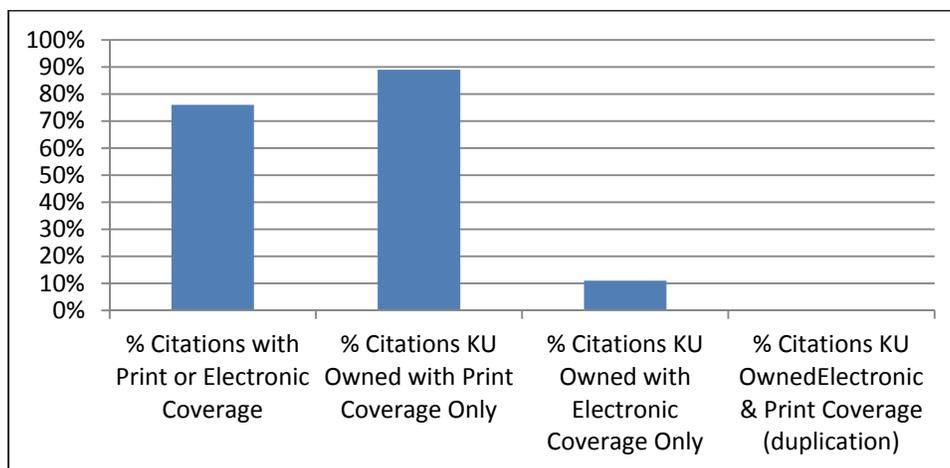


Figure 6. Physics Books with KU Access (By Format)

### Physics Books

KU provided access to 76% of the books cited by Physics faculty (Figure 6). Eleven percent of these were available in electronic only format, while 89% were available in print. There was no duplication in formats. Cambridge and Wiley-Blackwell were the lead publishers. Eighty-nine percent of the books could be found in the Q call number range. The average publication date was 1997.

### **Humanities**

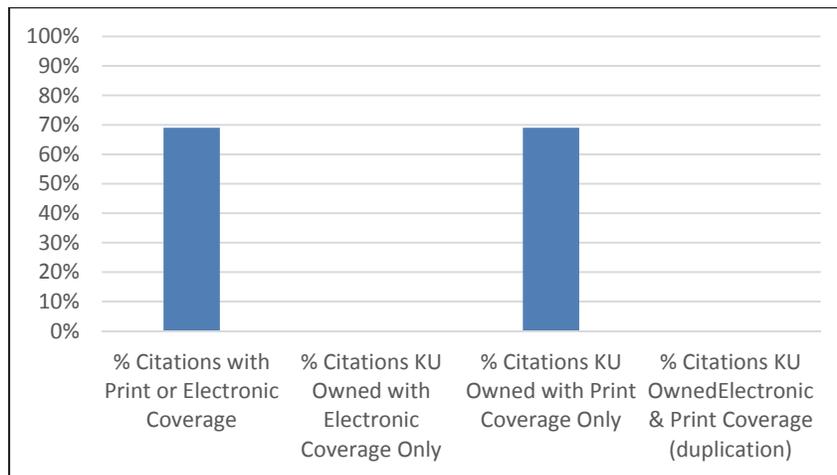
#### *Art History*

The authors analyzed 105 citations for Art History. Of those, KU owned 67%. Eighty percent of the resources were in print, and 11% were available electronically. Only 9% were duplicated in print and

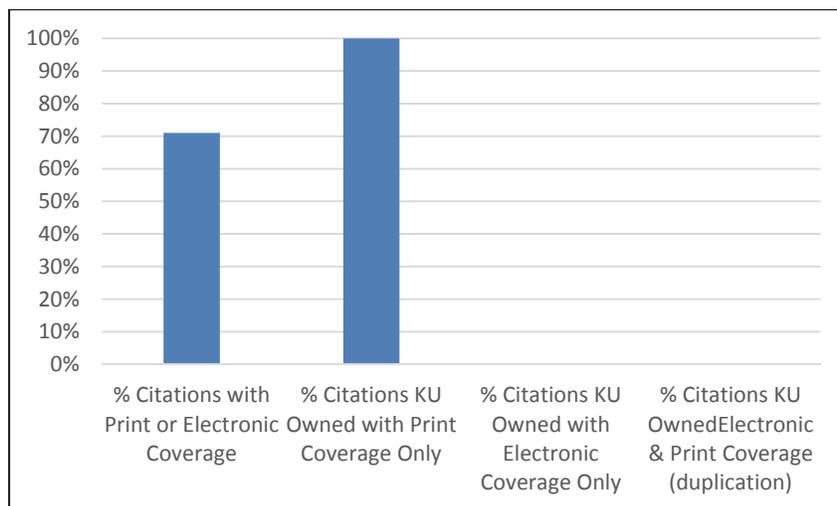
electronic formats. Of the 33% not owned by KU, 43% were books, 11% were journals, and 43% were art work.

#### Art History Journals

Only 12% of the citations in Art History were journals, and KU provided access to 69% of journal citations (Figure 7). None of the journals were available electronically, so there was no duplication. Zero percent were available in large journal packages, and 56% were available in aggregator databases. The University of London Press was the top publisher, and 38% of the citations could be found in the N call number range, which was the dominant call number. The average publication date for Art History journals was 1959.



**Figure 7. Art History Journals with KU Access (By Format)**



**Figure 8. Art History Books with KU Access (By Format)**

Art History Books

KU provided access to 71% of the books cited by the Art History faculty (Figure 8). None of the titles were available electronically, so there was no duplication of print and electronic formats. Cambridge and Routledge were the top two presses. Almost all of the books could be found in the N's (62%), B's (13%), and D's (7%). The average publication date was 1966.

*English*

Out of the 285 citations analyzed for English, KU owned 88%. Seventy percent of these citations were in print, while 7% were available electronically. Twenty-three percent were duplicated in print and electronic formats. Of the

12% that KU did not own, 85% were books and 15% were journals.

English Journals

Twenty-three percent of the English citations were for journals, and KU provided access to 92% of the cited articles (Figure 9). Twenty percent were available electronic only, and 22% were in print only formats. Fifty-eight percent were duplicated in print and electronic formats. Forty-six percent of the citations were available in a large journal package, and 52% were found in aggregator databases. Sage and the National Council of Teachers of English were the dominant publishers. Thirty-four percent of the journals could be found in the P call number range, and 18% could be found in the L's. The average publication date was 1990.

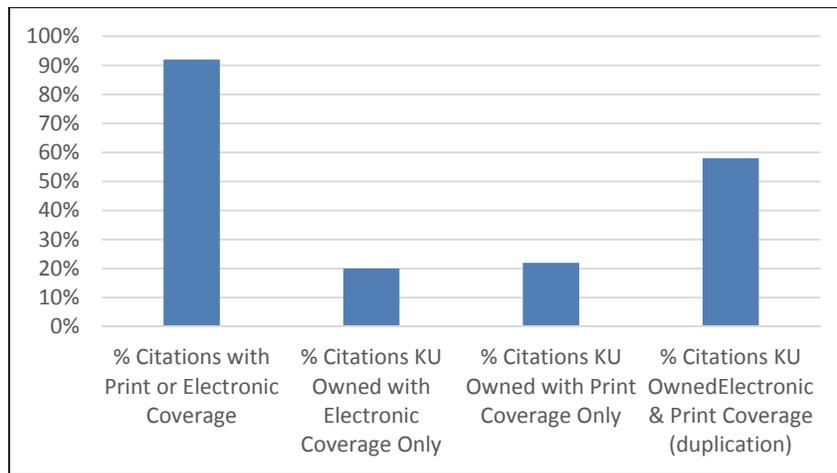


Figure 9. English Journals with KU Access (By Format)

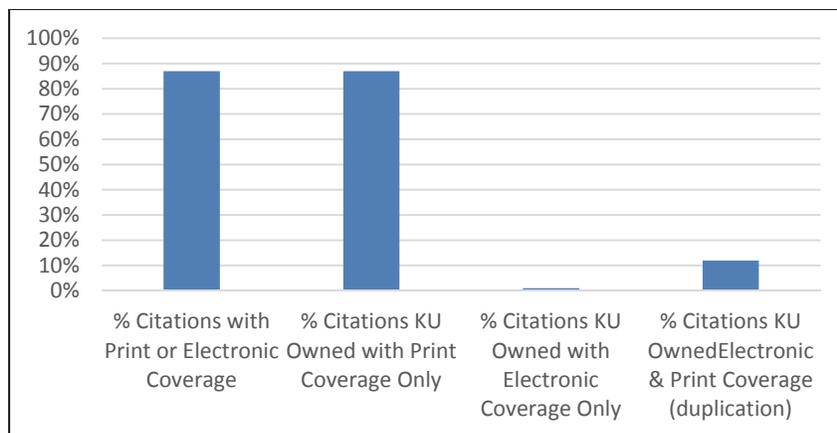


Figure 10. English Books with KU Access (By Format)

English Books

Seventy-seven percent of the English citations were for books, and KU provided access to 87% of the titles. Nineteen percent of these were available electronically, and 87% were in print. Twelve percent were duplicated in print and electronic formats. Routledge, Oxford, and Earlbaum were the top publishers. Fifty-six percent of the books could be found in the P call number range, while 16% were in the H's and 6% were in the L's. The average publication date was 1989.

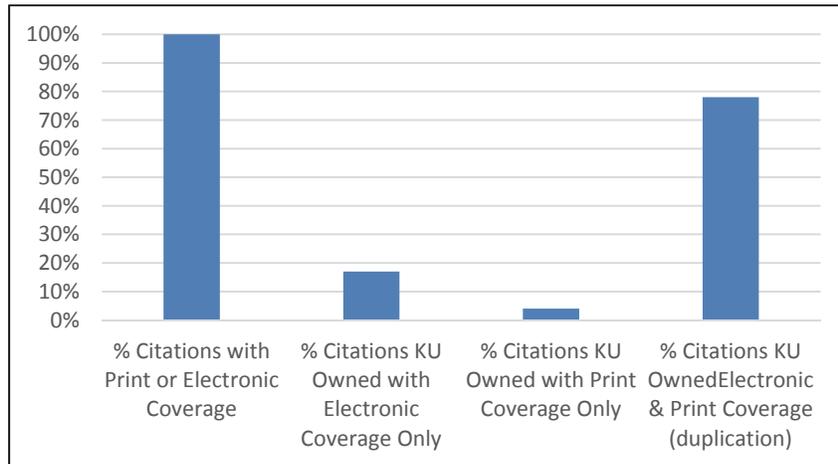
*Philosophy*

Seventy-five citations were analyzed for Philosophy. KU owned 97%: 34% in print only, 11% electronic only resources, and 55%

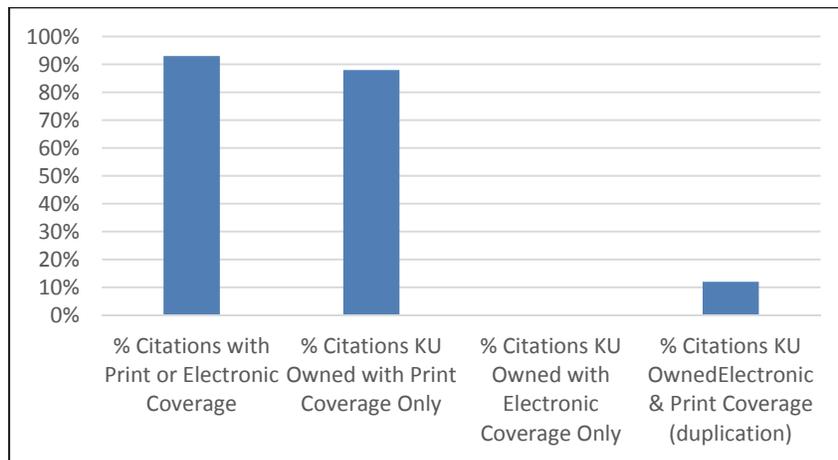
duplicated in print and electronic formats. Only 3% were not owned by KU, and 100% of these were books.

Philosophy Journals

Sixty-one percent of the Philosophy citations were for journals, and KU owned 100% (Figure 11). Seventeen percent were available electronically, and 4% were in print only. Seventy-eight percent were duplicated in print and electronic formats. Forty-six percent of the journals were available in large journal packages, while 87% could be found in aggregator databases. Oxford and Wiley-Blackwell were the top two publishers. The top call number ranges were H (39%), K (33%), L (15%), and B (11%). The average publication date was 2001.



**Figure 11. Philosophy Journals with KU Access (By Format)**



**Figure 12. Philosophy Books with KU Access (By Format)**

Philosophy Books

KU owns 93% of the books cited by Philosophy faculty (Figure 12). None of them are available in electronic-only format. Eighty-eight percent are available in print only, and 12% are duplicated in print and electronic format. Cambridge and Wiley-Blackwell were the dominant publishers. The call numbers replicated the same percentages as the journals. The average book publication date was 1999.

**Social Sciences**

*Psychology*

The authors analyzed 523 citations in Psychology. Eighty-nine percent were owned by KU: 29% in

print and 20% in electronic format. Fifty-one percent of the titles were duplicated in print and electronic formats. Of the 11% not owned by KU, 30% were books and 61% were journals.

Psychology Journals

Eighty-one percent of the Psychology citations were for journals. KU owned 92% of these: 20% in electronic format and 22% in print (Figure 13). Fifty-nine percent were duplicated in print and electronic formats. Sixty-seven percent were available in large journal packages, and 27% could be found in aggregator databases. Plenum Press, American Psychological Association, and Sage were the dominant presses. The top call number ranges included R (49%), B (25%), and H (14%). The average publication date was 1997.

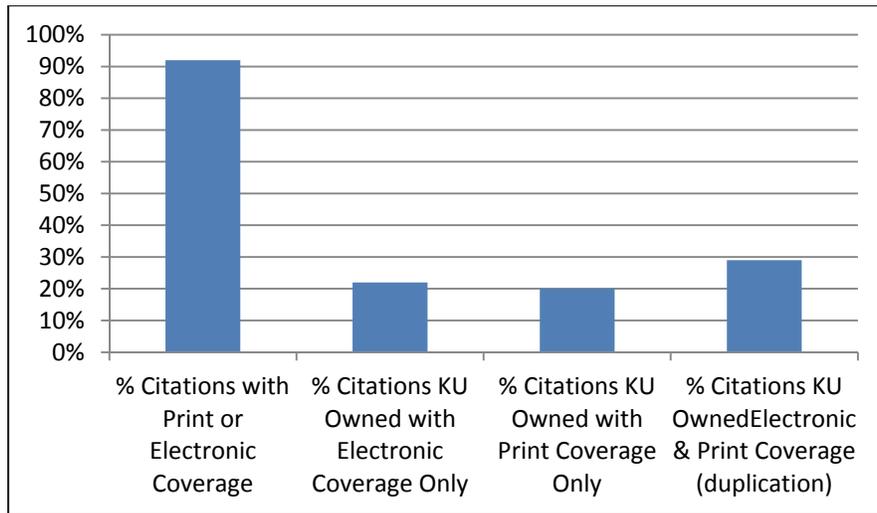


Figure 13. Psychology Journals with KU Access (By Format)

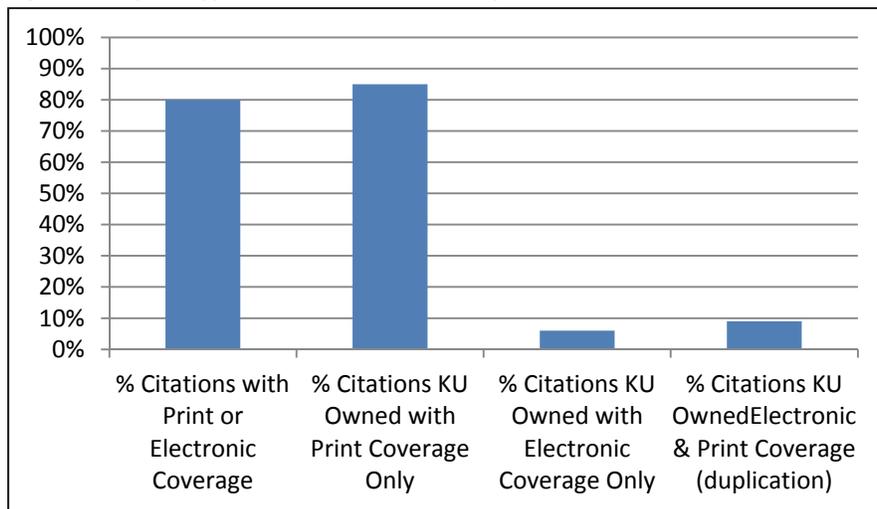


Figure 14. Psychology Books with KU Access (By Format)

Psychology Books

KU owned 80% of the books cited by Psychology faculty (Figure 14). Six percent were available electronically, and 85% were in print. Nine percent were duplicated in print and electronic formats. The top two publishers were Wiley-Blackwell and Earlbaum. The most used call numbers ranges were R (26%), B (25%), and H (23%). The average publication date was 1996.

*Political Science*

Four hundred and forty-six citations were analyzed for Political Science, and KU provided access to 90% of the titles. Forty-three percent

were in print-only format, and 15% could be access only in electronic format. Forty-two percent were duplicated in print and electronic format. Ten percent were not accessible at KU: 50% of which were books and 11% were journals.

Political Science Journals

KU owned 97%, 22% in electronic-only format and 5% only in print cited by Political Science faculty (Figure 15). Seventy-three percent were duplicated in print and electronic formats. Wiley-Blackwell, Cambridge, and Springer were the top publishers. The top call numbers were J (5%), D (13%), and H (12%). The average publication date was 1995.

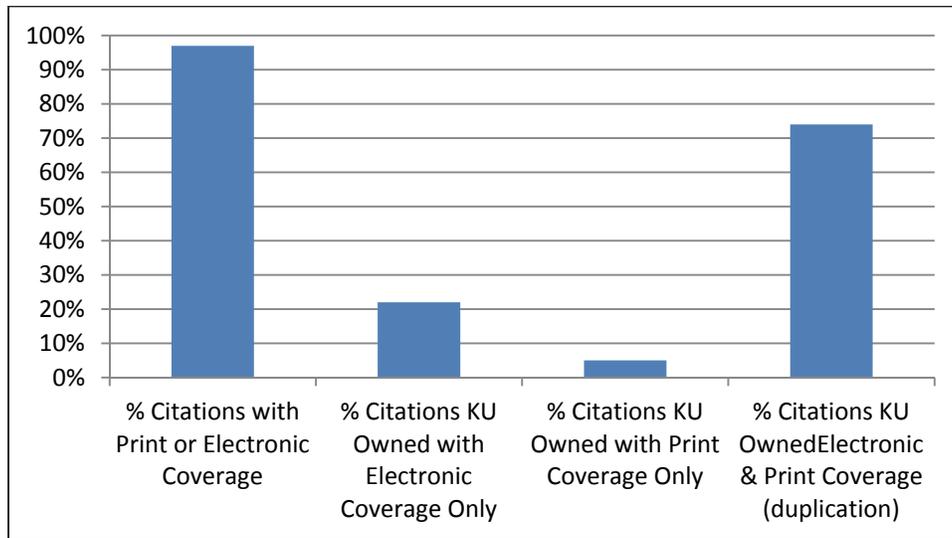


Figure 15. Political Science Journals with KU Access (By Format)

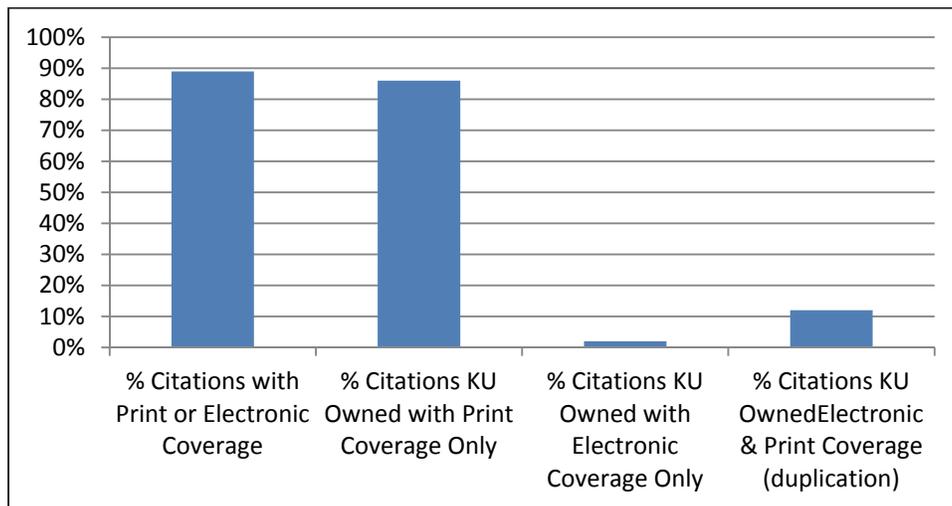


Figure 16. Political Science Books with KU Access (By Format)

Political Science Books

Fifty-seven percent of the citations in Political Science were for books. Eighty-nine percent of the books cited were owned by KU (Figure 16). Two percent were available in electronic-only format, while 86% were available only in print. Twelve percent were duplicated in print and electronic formats. University presses were the publishers of choice for the faculty in Political Science. J (61%) and H (14%) were the favorite call number ranges. The average publication date was 1995.

*Economics*

The authors analyzed 277 Economics citations. KU owned 86% of the titles, with 20% in print-only format and 18% available only in electronic format. Sixty-two percent of the titles were

duplicated in print and electronic formats. KU did not have access to 14%, 28% of which were books and 49% journals.

Economics Journals

Eighty-one percent of the Economics citations were for journals, 92% of which KU owned (Figure 17). Seventeen percent were available in electronic only format, while 13% were only in print. Seventy-one percent of the journals were duplicated in print and electronic formats. Fifty-eight percent were accessible in journal packages, and 39% could be found in aggregator databases. The favorite publishers included Elsevier, Oxford, and Springer. Eighty-six percent of the journals could be found in the H call number range. The average publication date was 1996.

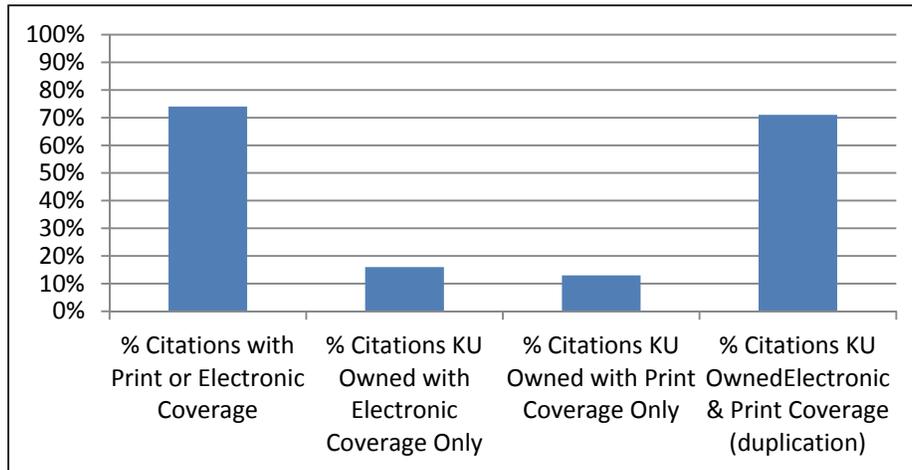


Figure 17. Economics Journals with KU Access (By Format)

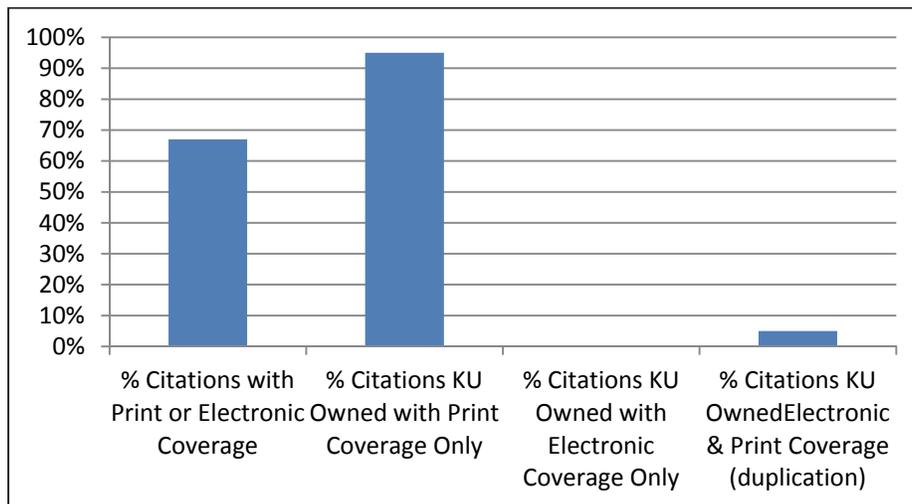


Figure 18. Economics Books with KU Access (By Format)

## Economics Books

KU owned 67% of the books cited in Economics (Figure 18). None of them were available in only electronic format, but 95% could be found in print. Five percent of the books were duplicated in print and electronic formats. The most popular publisher was Elsevier and the most popular call number ranges were H (7%) and Q (21%).

## **Discussion and Conclusion**

The authors were gratified to discover that the KU Libraries provided access to 92% of the journals and 80% of the books used by the faculty. Forty percent of the citations not owned by KU were journals, and 39% were books. Further analysis broken down by broad subject area affirmed that the KU Libraries provided 85% of the resources cited in the humanities, 85% of the sciences citations, and 89% of the citations in the social sciences.

Even though the KU Libraries have made a concerted effort in recent years to deduplicate print and electronic access to journals by going electronic-preferred, the authors were disappointed to find that there was still 52% overlap of print and electronic journals. This is probably due to the policies of many publishers who do not allow libraries to cancel print subscriptions in favor of electronic access without losing electronic access too. There is far less duplication in the humanities than the other two broad subject areas, with only 26% duplication compared with 65% in the social sciences and a whopping 97% in the sciences.

The authors were also pleased that 67% of the journal citations could be found in journal packages. This was reaffirming since a very large percentage of the collections budget is spent on these packages. The expensive journal packages do a much better job of covering the sciences and social sciences than they do the humanities. Thirty-eight percent of the journal citations were found in aggregator databases, which also confirmed that money was well spent when

paying for these electronic resources. Aggregator databases do a good job of covering all subject areas.

They were surprised to find out that 1991 was the average overall age of the journal publications that were sampled. Particularly surprising was the average publication date in the sciences, which was 1993, dispelling the notion that scientists only use recent publications. The authors consulted with the science librarians who informed them that the older publications in EEB and Geology were not surprising considering they often cite classic works that were written on the foundations of evolutionary theory and paleontology.

On the specific subject level, the authors were surprised to find that Political Science used more books than journals. They were also amazed to find that Philosophy used very few materials in their B call number range. Most of the materials they cited were from the social sciences. English also cited resources from an array of call number areas that were not in the P call number range, mostly from the social sciences. Philosophy also surprised the authors by citing the most recent average publication date, 2001. The sciences pretty much stuck to call numbers in their disciplines, but the social sciences and humanities proved to be much more multidisciplinary.

It was no surprise that the top journal publishers overall were Wiley-Blackwell, Elsevier, Oxford, and Springer since they provide a large portion of journals to KU through large journal packages. The top book publishers were Cambridge, Oxford, and Wiley-Blackwell.

The authors concluded that the KU Libraries does a satisfactory job of supporting the needs of researchers at KU. There were no significant weaknesses in the collection identified with this study, but there are some slight adjustments that may need to be made to the budget allocations. Overall, this study points mostly to the fact that KU Libraries have supported the various disciplines quite well.