

# RESTRICTIVE ACCESS POLICIES CUT READERSHIP OF ELECTRONIC RESEARCH JOURNAL ARTICLES BY A FACTOR OF TWO

MICHAEL J. KURTZ

Harvard-Smithsonian Center for Astrophysics, Cambridge, MA 02138

## ABSTRACT

By using the access logs of the NASA Astrophysics Data System Digital Library it is possible to evaluate how the different access policies of different journals and publishers effect the reading behavior of working researchers. Compared to those journals with the easiest access the access control policies of the most restrictive journals prevent about as many article reads as they allow.

*Subject headings:* Research Journal Use, Open Literature

## 1. INTRODUCTION

The NASA Astrophysics Data System Digital Library (ADS: e.g. Kurtz, et al 2004) sits at the center of Astronomy's digital library, perhaps the most advanced in the sciences. According to a recent independant survey (Boyce, personal communication) nearly every active astronomy researcher uses the ADS very frequently.

Users of the ADS are overwhelmingly astronomy researchers, they are largely found in large universities and research institutions.

When a researcher makes a query to ADS, ADS presents her/him with an ordered list of papers which match the query. The list includes the title, author list, and journal reference for each paper. Also ADS presents the user with a list of options to obtain more information, the most frequently retrieved additional information are the abstract, the full text, and the citations, there are several other possibilities.

## 2. THE EXPERIMENT

When (and if) the researcher chooses to view more information on an article (by clicking on the appropriate link) this fact is recorded in the ADS log, we store the users unique "cookie" id number, the article code, and the type of access. There are more than 8 million such requests per year.

With the exception of the full text of an article all the rest of the information linked to by the ADS is free and available without encumbrance to all users. The access to the full text is controlled by the journals and depends on their policies and the type of (or lack of) subscription held by the users local library.

Users may access more than one type of information for a single article over a period of time. In this experiment I look at the information requested on individual articles by individual users during the month of October, 2003. From the ADS logs I extract the total number of unique individual user — individual paper pairs with-out regard to which or how many information links were followed, and the number of these pairs where at least one of the information links followed went to the full text of the article.

I next examine these data as a function of field (astronomy of physics) and publisher of the articles. The result is in the table.

Clearly not all users will want to see the full text, for

TABLE 1. JOURNAL USE FRACTIONS

Publisher	FT Fraction	Access
Astronomy A	.63	100%
Astronomy B	.60	95%
Astronomy C	.59	94%
Astronomy D	.51	81%
Physics A	.47	75%
Physics B	.44	70%
Astronomy E	.34	54%
Astronomy F	.30	48%
Physics C	.29	46%

many reading the abstract, or looking at the citation list, will fulfill his/her needs. Also clearly many will want to read the full text. I estimate the fraction of those who want to read the whole text by examining the results for *The Astrophysical Journal*. The *ApJ* has been a leader in on-line journals (the first major journal available in HTML was *The Astrophysical Journal (Letters)* in 1995), subscriptions are inexpensive (half the cost is paid by page charges, and it is non profit), and as the largest and most important single journal of astronomy is absolutely required for serious astronomy research. A large majority of ADS users are astronomy researchers, we believe the fraction of regular ADS users who do not have electronic access to the *ApJ* must be a few percent or less.

The fraction of unique user — paper pairs where one of the accesses is to the full text for the *ApJ* is .62. The fraction for the publisher of the *ApJ* is slightly higher, .63. I take this to be the fraction of users who want to view the full text of papers they look up using ADS. In the table I list a number of publishers and their full text fractions, also I list the percentage of users who want to access the full text who can, using the *ApJ*'s publisher (Astronomy A in the table) to define 100% .

## 3. DISCUSSION

There is a large differential between the access fractions at the top of the table and the bottom, the publisher on the bottom appears to restrict access to more than half of the researchers who would want to read their journals.

The top three publishers represent the core astrophysics literature; while none is very expensive Astronomy B is substantially more expensive per page than

Astronomy A and Astronomy C. There is no significant difference between the top three publishers in terms of access; essentially all astronomers must have access to all the involved publications.

Astronomy D is representative of a class of journals which are "second tier" in terms of research impact. Most libraries subscribe to them, but not all. 20% of the potential readership of articles in these publications is lost due to the access restrictions.

Publishers Physics A and Physics B are scholarly societies and have similar subscription and access policies as Astronomy A and Astronomy C. As they are not part of the core of astrophysics astronomy libraries are more likely to pick and choose titles from these publishers to subscribe to. 25%–30% of potential use by astronomers is lost by the ensuing access denials.

Astronomy E is published by a scholarly society; it is expensive and has very restrictive use policies. It is the only set of journals of those listed here which I cannot access from my desk, I must physically use a terminal in our library. The journal is part of the core literature of a subfield of astronomy; without the restrictions it would be used nearly twice as much.

Astronomy F is a single journal, the core journal for a sub-field of astronomy. It is normally subscribed to via a large, expensive bundle of journals from a commercial publisher. Although use of this journal is required for participation in its sub-field the useage is low, fewer

than half of the potential reads actually occur. Clearly the subscription and access policies of the publisher are preventing substantial access to this journal.

Publisher Physics C is actually the same as Astronomy F; the bundle of journals from this publisher would normally include the many physics journals as well as the astronomy journal. Again more than half of the potential use of these journals by astronomers is lost due to the access restrictions.

#### 4. CONCLUSIONS

All of the journals presented here are by subscription, none is open access. Access depends on an individual researcher's library and the funding it receives. As one wanders from the core literature, or wanders into regions controlled by publishers with very restrictive policies, the ability to read the literature goes down substantially. This is especially true outside large universities where different disciplines can form consortiums.

While astronomers have relatively easy access to the core literature, much of what astronomers actually want to read is denied them. The entire database has a access percentage of only 80% access is denied to ADS users for approximately 50,000 articles per month which they would otherwise read. This is about one per week per astronomer.

#### REFERENCES

Kurtz, M.J., Eichhorn, G., Accomazzi, A., Grant, C., Demleitner, M., and Murray, S.S., 2004, Worldwide Use and Impact of the NASA Astrophysics Data System Digital Library, Accepted for Pub-

lication in Journal of the American Society for Information Science and Technology. Preprint at: <http://www.cfa.harvard.edu/~kurtz/jasist1-abstract.html>