



Research Publications Online: Too Much of A Good Thing?

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New research shows that as more scholarly and research journals are available online, researchers cite fewer, newer papers

The Internet gives scientists and researchers instant access to an astonishing number of academic journals. So what is the impact of having such a wealth of information at their fingertips? The answer, according to new research released today in the journal *Science*, is surprising--scholars are actually citing fewer papers in their own work, and the papers they do cite tend to be more recent publications. This trend may be limiting the creation of new ideas and theories.

James Evans is an assistant professor of sociology at the University of Chicago, who focuses on the nature of scholarly research. During a lecture on the influence of private industry money on research, a student instead asked how the growth of the Internet has shaped science. "I didn't have an immediate answer," Evans said in an interview last week.

When he reviewed the research on the Internet and science, Evans discovered that most of it focused on much faster and broader the Internet allows scholars to search for information, but not how the medium itself was impacting their work. "That's where this idea came from. I wanted to know how electronic provision changed science, not how much better it made it," he said.

After receiving support from the National Science Foundation to pursue this question, Evans analyzed a database of over 34 million articles and compared their online availability from 1998 to 2005 to the number of times they were cited from 1945 to 2005. The results showed that as more journal issues came online, few articles were cited, and the ones that were cited tended to be more recent publications. Scholars also seemed to concentrate their citations more on specific journals and articles. "More is available," Evans said, "but less is sampled, and what is sampled is more recent and located in the most prominent journals."

Evans's research also found that this trend was not evenly distributed across academic disciplines. Scientists and scholars in the life sciences showed the greatest propensity for referencing fewer articles, but the trend is less noticeable in business and legal scholarship. Social scientists and scholars in the humanities are more likely to cite newer works than other disciplines.

So what is it about doing research online versus in a bricks-and-mortar library that changes the literature review so critical to research? Evans has identified a few possible explanations. Studies into how research is conducted show that people browse and peruse material in a library, but they tend to search for articles online. Online searches tend to organize results by date and relevance, which leads allows scholars and scientists to pick recent research from the most high profile journals. Some search tools like Google factor the frequency with which other users select an item during similar searches to determine relevance. Online, researchers are also more likely to follow hyper-



Having research papers and other scholarly writing available online gives researchers access to a great deal of materials without having to enter a library. But how does this impact the new research that they produce? James Evans at the University of Chicago has studied this question and his conclusion is surprising--despite having greater access to scholarly materials, researchers are actually citing fewer papers. The papers they do cite tend to be newer and are likely to be cited by other researchers. -- Credit: Jupiter Images

linked references and links to similar work within an online archive. Because of this, as more scholars choose to read and reference a given article, future researchers more quickly follow.

Does this phenomenon spell the end of the literature review? Evans doesn't think so, but he does believe that it makes scholars and scientists more likely to come to a consensus and establish a conventional wisdom on a given topic faster. "Online access facilitates a convergence on what science is picked up and built upon in subsequent research." The danger in this, he believes, is that if new productive ideas and theories aren't picked up quickly by the research community, they may fade before their useful impact is evaluated. "It's like new movies. If movies don't get watched the first weekend, they're dropped silently," Evans said.

Evans plans to work with linguists and computer scientists to explore how ideas are expressed in articles to better understand what the consequences of losing old ideas are and how they can be retrieved and resurrected, a challenge he sees as being important in the pursuit of knowledge. "With science and scholarship increasing online, findings and ideas that don't receive attention very soon will be forgotten more quickly than ever before."

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