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Google U.: Is Google "Good Enough" for Higher Education?

1. Introduction

The IT corporation Google, incorporated in 1998 by Sergey Brin and Larry Page, has become ubiquitous in the lives of young people (the so-called Net Generation or Google Generation, born after 1980). If they need to know something, they Google it, using the company's proprietary search engine. They also use Google's numerous free services such as Gmail, Google Talk, and many others. When they enter a college or university, they are likely to continue these habits, using Google Book Search and Google Scholar to conduct research for their coursework. Google increasingly interpenetrates higher educational institutions, providing e-mail services, software applications, search services, and access to the Google Library Project, an immense archive of digitized books created in collaboration with prominent universities.

Up till now Google has provided these services free. In accordance with its slogan "Don't be evil," Google's avowed aims are to disseminate information and provide Internet services, emphasized even when Brin and Page took the company public in 2004. (Vise 2005, 6, 16-17, 85, 174-8; Stross 2008, 15, 21). Despite the founders' claim that "we run Google a little bit like a university" (Vise 2005, 16), Google, however, is not a formal academic institution; it is a highly profitable corporation. Its revenues ($16.5 billion dollars in 2007) and net income ($4.2 billion in 2007) derive mainly from the minimalist text-based, keyword-focused advertisements displayed on its search pages and sites. (Vise 2005, 47, 88-90, 95; Stross 2008, 5) In fact, as this paper will argue, Google's goal is to generate more and more pages of information so that these pages can bear its advertisements.

Google's impact on higher education requires closer examination. This paper will examine several Google services: Google Apps for Education, the Google Library Project, and the Google search engine and Google Scholar. Other applications likely to be used by students, such as Google Talk, Google Earth, the newly launched browser Chrome, and YouTube (acquired by Google) will not be discussed here.

Google Apps for Education, including e-mail and software as a service, was adopted by many educational institutions for students. It is unsatisfactory for other academic computing.

Higher education CIOs need to decide whether they want to shift control over e-mail and other services from the institutional IT department to a corporate giant, balancing the cost savings and student preferences against the loss of privacy and control. Even if CIOs choose open source applications developed by higher educational consortia, the advent of "cloud computing" (not monopolized by Google) is likely to transform the nature of the university, geographically dispersing students who can access Web-based documents and course management software anywhere at any time, leveling small and large research institutions, and transforming the nature of the college or university community. (For a general survey of the phenomenon, emphasizing open source applications and access, Katz 2008.)

Google is also likely to transform college and university libraries and academic publishing. Google's role as a free provider of digitized book searches and partial text access may soon end, as a result of Google's October 2008 settlement with the American Association of Publishers and the Authors Guild. Google Book Search formerly was (and still is) free but displays only a limited amount of content per book. The future Google Library will provide greater access to digitized books, but will require university and college libraries to subscribe if they want to provide access on the scale that students and faculty will probably demand. Print-on-demand services (a few pages or entire books) will require payment that will be routed to copyright holders, but Google will take a cut. If Google is not thwarted by a pending antitrust investigation, the Google Library settlement will have a profound (and still unknown) impact on academic libraries' budgeting, acquisitions and usage patterns. Because academic libraries are the major buyers of academic press books, the publishing industry will also be affected.

It is also uncertain whether the Google Library Project is meeting or will meet standards that academic librarians and library and educational organizations have devised for mass digitization projects. For an academic library to use the Google Library to replace a major part of acquisitions would thus satisfy some information communities but risk alienating others and compromising the academic library's mission.

The use of Google as a search engine is one of the Net Generation's most characteristic information seeking behaviors. Unfortunately, this information seeking behavior tends to be highly superficial and poorly informed. Students usually do not understand how Google's search algorithms operate and tend to trust Google first-page results as the most "reliable" answers. They have little training in evaluating websites. These behaviors frustrate students' instructors

and have broader implications for the education of an informed public. The creation of Google Scholar only partially answers this problem. Instructors need to join with libraries -- both physical ones and the digital libraries of the future -- to promote students' information literacy and critical thinking skills. (Oblinger 2008, 19-20)

In short, at present Google provides information services that are "good enough" (Hartman and Mullen 2008, 215; Potter 2008, 20), the words of a popular principle in software design with essentially utilitarian goals. "Good enough" services meet the elementary needs of the greatest number of users in the shortest time and for the lowest cost. In accordance with "good enough" software development, time spent on developing more sophisticated and expensive software is wasted, since only a few users would appreciate all of its features. But are Google's services "good enough" for higher education? In contrast with the general public or Google itself, higher education involves a more diverse range of information communities -- students, faculty, financial and regular administrators, IT personnel, librarians, publishers, academic organizations, IT vendors -- whose needs, standards, and aspirations must be taken into consideration.

Google Apps for Education and the Cloud

In "cloud computing," an end user (individual or institution) does not purchase software that runs on his or her personal computer or institutional servers. He or she obtains access over the Internet to applications and services that run centrally on the service providers' machines. Cloud computing provides "software as a service" (SaaS) and can provide access to remote platforms and APIs, as in the Google Apps Engine. (EDUCAUSE 2008; Katz 2008; Knorr and Gruman 2008; Stross 2008, 153; Alexander 2009) Users of cloud computing can even draw on the massively distributed resources of the cloud. For instance, Google Translate's services do not emulate language morphologies, grammar, or syntax but employ statistical methods based on the enormous volume of text in the copies of the Web stored on its servers. (Stross 2008, 84-5) Google’s servers offer much greater computing resources than all but the major research universities can provide. (S. Baker 2007) Google and IBM have teamed to promote access to distributed computing resources that could, for instance, provide a college or small university

with the supercomputing resources previously available only to major research universities. (Google Press Center 2007; Young 2008c)

The cloud is a drastically different model from most higher education computing, in which IT departments buy hardware, create or approve and purchase software, install software on institutional servers, and train staff in its use and maintenance. (on the traditional model, Stunden 2006) Within the institutional network, a user may have remote access to part of the network, but he or she is still using institutional resources. Most universities and colleges have their own Internet domain address (.edu). Institutional IT departments traditionally provide their own support, upgrades, and security. In contrast, the users of cloud services are not responsible for authentication, security, technical support, upgrades, and hardware and in effect yield control to the provider of the services. (Knorr and Gruman 2008)

Nonetheless, cloud computing and outsourcing in general are prominent trends in higher education computing. (Alexander 2009) IT departments need a pragmatic approach to doing more with less, which can be accomplished both by outsourcing and by centralization. (Norris, Lefrere and Mason 2006. 92; Hawkins 2007, 65-66) Arizona State University broke new ground when it adopted Google's free Gmail e-mail service for its 65,000 students, producing a savings of $350,000 to over $500,000. (Young 2006; Robison 2007, 18; Stross 2008, 169; Carnevale 2008) Created in 2004, Gmail was popular with students, because many of them were already familiar with it and because it offers more storage. Initially Gmail offered 1 gigabyte of storage per user; at the time of the deal with Arizona State, Gmail offered 2 gigabytes in contrast with Arizona State University's 50 megabytes per student. (Vise 2005, 153-4; Young 2006) Many other universities have since adopted Gmail for student e-mail services (Carnevale 2008), including Abilene Christian University, Northwestern University, Notre Dame University, Trinity College Dublin, the University of California at Los Angeles, the University of North Carolina at Greensboro, the University of Pennsylvania, and the University of Southern California (Young 2006; EDUCAUSE 2007; Stross 2008, 169-76; Carnevale 2008) These services are outsourced to Google, and can be said to be centralized in that Google handles support and security.

Google offered Gmail as part of its free Google Apps for Education, a cloud computing suite including Office-like applications and communication services: (EDUCAUSE 2008)

- Gmail
- Google Docs (word processing, spreadsheets, and presentations)
- Google Calendar
- Google Sites (website design)
- Google Talk

A premium edition offers more features (Blogger, Google Maps, Google Earth, Google Scholar, Google Mobile).

An early concern that Google would dilute institutional branding was soon laid aside, as institutions using Gmail for student e-mail could keep the institution's name and domain .edu in their e-mail addresses, and Google pages could be customized to display the university's name and logos. Google also assured institutions that it would not put advertisements on students' Gmail pages (though ads appear on alumni pages when alumni continue to use Gmail). (Carnevale 2008)

However, Google Apps seems limited to the student information community within higher education. The applications are for individual rather than institutional uses and their functionality is limited in concordance with the "good enough" principle. (EDUCAUSE 2008) Gmail especially is poorly suited to administrative computing since it does not allow a fine degree of control. Universities that "go Google" usually prefer to retain in-house control of administrative computing and its vital data. (Stross 2008, 175-6) Even the choice to implement student access to Gmail is a trade-off from the point of view of security and privacy. Public universities are required to comply with FERPA, which protects student privacy. (Carnevale 2008) Google assured institutions that its employees would not read students' Gmail; the mail is scanned automatically for malware. As Stross remarks, “compliance with the law is manageable when one uses one’s own servers; relying entirely on Google Apps in the cloud has yet to be tried, let alone sanctioned.” (Stross 2008, 176; on privacy concerns, also Lackie 2008, 191-193)

Google has not yet devised a full-scale course management system, though Google Docs, Google Talk, Google Groups, and Google Sites can be used for more informal course teaching and as collaboration tools. For K-12 education, often short of funds for library and computing resources, Google Apps for Education is desirable. (Langley 2008; Lackie 2008, 190) However, for colleges and universities, a dedicated course management system is more desirable, kept in-

house due to security issues (protecting privacy and confidentiality of grades). Google Docs, Talk, Groups and Sites enable individuals to collaborate, but they do not have the specific functionality of course management software, which may require many levels of access.

Material factors pressure university CIOs and IT departments towards the use of Google Apps and other cloud services. If in-house student e-mail costs tens to hundreds of thousands of dollars a year and Gmail costs nothing, there is a strong push to use Gmail. The purchase of word processing and other home office software for campus computers is also expensive. The institution also saves resources by outsourcing support to Google. The savings can be invested in other IT development or other institutional resources. These factors are likely to mediate against privacy concerns for student e-mail services, but in-house administrative computing retains the attraction of tighter security (Stross 2008, 175-6). However, the dichotomy of free Google services vs. expensive software vendors such as Microsoft (an image promoted and exploited by Google) is artificial. Open source provides a "third way" without relying on corporate affiliation.

Google Book Search and the Google Library Settlement

Google introduced its mass digitization project, then called Google Print, in October 2004. (Vise 2005, 228-239; Robison 2007) It negotiated collaboration with major university libraries to scan their book collections. Google did not disbind books in order to scan the pages flat, an earlier phase of digitization technology deplored by N. Baker (2001); Google has emphasized that its digitization methods are nondestructive to books, opening them gently and partially to scan the pages. (Vise 2005, 232) The initial participants were Stanford, Harvard, the New York Public Library, Oxford, and the University of Michigan, the last being the only one to allow digitization of all books in its libraries. The number of participating academic library systems (U.S. and international) rose to 28 by 2007 (Robison 2007). The U.S. participating systems presently include

- Columbia University
- Cornell University
- University of Chicago

- University of Illinois
- Indiana University
- University of Iowa
- University of Michigan
- Michigan State University
- University of Minnesota
- New York Public Library
- Northwestern University
- Ohio State University
- Penn State University
- Princeton University
- Purdue University
- Stanford University
- University of Texas-Austin
- University of Virginia
- U. of Wisconsin-Madison

Harvard University pulled out as a result of the Google Books settlement. Non-American library systems include Oxford University, the Biblioteca de Catalunya, the University Library of Lausanne, Ghent University, Keio University (Japan), the Bayerische Staatsbibliothek, and the Lyon Municipal Library. (Robison 2007; Google Books 2009)

The original Google Book Search digitized the entire text of books in order to make them searchable; it is in effect a search engine for strings in books, in which searches for a word or phrase display several lines adjacent to the term on both sides. Whether or not the entire page can be displayed varies. The entire texts of public domain works can be read. To reassure copyright holders, Google Book Search allowed an user to "preview" only 20 percent of an in-copyright book; no preview is available for certain books, mostly reference works. (Stross 2008, 97) Other works in copyright had only "snippet view" available because Google lacked permissions to display them. [See Exhibits 1-4.] Some scholars were concerned that access to only snippets of text "atomized" books. (Gorman and Wilkin 2005). However, quick reading of a print book by looking up terms in the index is just as bad. Google Books' digitization indexes all the words of a

book, giving it much greater recall than a print index, though not the analytical function of a good print index.

The overall effect of Google Book Searching may also have been good for booksellers and libraries, enabling users to search for and sample books, which motivated them to buy books, borrow them from libraries, or request them by interlibrary loan. (Gorman and Wilkin 2005; MacColl 2006) Google Book Search also has proved an useful source of academic citations, at least in the social sciences and humanities. (Kousha and Thelwell 2009)

In September 2005 the Authors Guild, unhappy that Google had not consulted all copyright holders for permissions to scan works, launched a class-action lawsuit against Google (*U.S. Authors Guild* v. *Google*). In October 2005 the Association of American Publishers launched a separate suit. (Robison 2007) Not all author communities were unhappy with Google Book Search; many commercial authors supported the lawsuit, but many academic authors, not dependent on royalties for their income, were grateful for Google's dissemination of their ideas. (Stross 2008, 100; Samuelson 2009) Microsoft backed the alternative Open Content Alliance. The lawsuits were settled in October 2008. The settlement constructs a complicated hierarchy of access summarized below. (Band 2008; Band 2009; ALA-OITP 2009)

In the settlement, Google created a Books Rights Registry to funnel payments to copyright holders. Individual users can access the entire text of public-domain works. They can view only 20% of the text of in-copyright, out-of-print works. To access more text of in-copyright, out-of-print works, or to print, they have to pay the Registry which provides a cut to Google (37%) and directs the rest of the payment (63%) to the copyright holders. In effect, users will buy digital books from Google, BRR, and the copyright holders. Google will provide free access at dedicated terminals in public libraries and nonprofit academic libraries (one terminal per public library, one terminal per a certain number of students enrolled in four-year and two-year institutions). But the small numbers of these terminals mean that many institutions will pay subscriptions to access the Google Library. Small colleges would not even qualify, by virtue of their size, for the free terminals. K-12 schools are also left out of account.

Users of an institutional subscription can access the entire text of in-copyright, out-of-print works, but must pay to print. Nobody will be able to access the whole text of in-copyright, in-print works, as well as some types of in-copyright, out-of-print works, such as dictionaries. Libraries that contribute scanned works receive digital copies and have some privileges as to

what they can do with them. It is not yet known what the fees for institutional subscriptions will be.

In April 2009 the U.S. Department of Justice launched an antitrust investigation against the Google Library settlement. (Helft 2009a) Critics of the settlement, supporting the antitrust investigation, contend that Google has creation a monopoly of access, especially a monopoly over in-copyright but orphaned books (not claimed by copyright holders). (Joint 2009, 337; Samuelson 2009) Google's settlement could provide a precedent for future lawsuits against other mass digitization projects by universities or nonprofits. According to a letter from the leaders of the ALA, ACRL and ACM, "the settlement could compromise fundamental library values such as equity of access to information, patron privacy, and intellectual freedom." (Davis et al. 2009) At the time of writing this paper, Microsoft, Yahoo, and Amazon.com have just allied to oppose the settlement, forming the tentatively titled Open Book Alliance with various open-access nonprofit groups. (Helft 2009b) This paper's remaining discussion, however, assumes that the settlement will proceed.

A major concern is whether these fees for accessing texts – a first for Google, in contrast with advertisements – will be prohibitive and have a deleterious effect on academic libraries and academic publishing. Academic library use is likely to decline further; students already tend not to employ academic libraries' physical resources. (Smith 2008, 11) Nicholas Joint warns that "[i]f the fallacious belief takes hold that Google provides significant amounts of [in copyright books] without charge, this will fatally undermine the support of academic staff for the principle of adequately funding library purchases of any sort." (Joint 2009, 335) It is also possible that institutional subscriptions to the Google Library will drive up already high prices of academic books, as has happened with print academic journals' subscription prices. Due to research libraries' subscriptions to full-text academic databases, fewer libraries take out subscriptions to print journals, and the print journals raise their prices accordingly.

Depending on the cost, quality and ease of printing, users of the Google Library, especially those without access to an institutional subscription, might still want to purchase physical books or seek them out in libraries. They will not have access to the text of in-print books in the Google Library. For many readers, nothing replaces the aesthetics of the traditional printed book, stressed by N. Baker (2001). Perhaps in competition with the future Google Library, Amazon.com will offer out-of-print books from the University of Michigan digital files

printed by its print-on-demand subsidiary Book Surge. (Howard 2008). Michigan also offers print-on-demand books in its library at a cost of about $10 per book. (Michigan 2009)

Also troubling is Google's lack of transparency and its mass digitization's emphasis on quantity and speed over quality. A minority of books have been digitized sloppily, producing unreadable images (Musto 2009), incompatible with long-term preservation goals. Various academic organizations and foundations, such as the ALA, the Andrew W. Mellon Foundation, OCLC, and the American Council of Learned Societies, have produced standards for non-commercial, open-access mass digitization projects that emphasize transparency, long-term preservation, and more freedom to manipulate files than Google Books is likely to provide. (Johnson 2007; Lynch and Hawkins 2006b, 52-56) Clifford A. Lynch speaks of Google's indexing as "lowest common denominator." (Lynch and Hawkins 2006a, 50) The technical method of scanning and character recognition used by Google does not work with older Gothic fonts (as well as some non-Roman fonts), and Google Books' indexing of words is not sophisticated enough to permit complex linguistic processing. (Martin 2008, 144-145) For these reasons, Google Books is unsuitable for complex textual scholarship.

It is also necessary to create digital collections that do not incur further copyright lawsuits, for which the *Authors Guild v. Google* lawsuit has created precedent. (Samuelson 2009) The Open Content Alliance and other digitization projects are alternatives employing Creative Commons licensing. (Lynch 2006b, 50-52; Samuelson 2009)

Another concern is the Anglo-American bias of the Google Library Project. The major research libraries that have signed up contain substantial literature and scholarship in non-English languages, and some international libraries have also signed up, but libraries around the world need to contribute mass digitization projects. The National Library of France early urged such a project and recruited participants (Labi 2005). Some world projects, such as the UNESCO World Digital Library, have chosen to emphasize quality over Google’s quantity, producing heritage-quality digital preservation of a relatively small number of documents that illustrate and preserve world cultures and history. However, Google itself has opened up informational access around the world.

Google Searches and Google Scholar

Google's search engine, the most used and oldest Google service, relies on Google's page ranking to return the most relevant search results at the top. Though the exact algorithm is a secret, the criteria of relevance include not only how popular a page is (how many clicks it receives), but how many other pages link to it, counting incoming links. (Vise 2005, 37) It (and also Google Scholar) has the advantage of simplicity; students prefer search engines to library resources and Google to other search engines (Van Scoyoc and Cason 2006, 49; Robison 2007, 16). Students perceive Google as easy, whereas they are intimidated by academic library resources. (Mullen and Hartman 2006, 117)

That students searching the Web display superficial information-seeking behavior was confirmed by a well-known study, "Information Behaviour of the Researcher of the Future," produced by University College London's CIBER institute. (CIBER 2008) Though the study is British, this information-seeking behavior is at least as prevalent among children and young people in the United States. (Cooper 2009) It has also spread to adults, a kind of informational attention deficit hyperactivity disorder suggested by Nicholas Carr's "Is Google Making Us Stupid?" (Carr 2008, challenged by Goldstein 2008) Among the habits of the students in the CIBER study were the tendency to use Google rather than other resources; the tendency to stop at the first hit or first page of search results; lack of evaluation of search results; scrolling and skimming while reading; and collecting downloads without reading them. Badke speaks of students' "false but common belief that 'someone' was controlling the Web so that most of what was found there was reliable." (Badke 2009, 48) Students tend to assume that the top search result is the most correct one. (Windham 2006, 5) Some instructors state that Googling "hinders the learning process by encouraging one-touch rapid research." Much information in proprietary databases, the so-called "deep Web," is also inaccessible to the Google search engine. (Vise 2005, 148-9)

However, if the searcher is well informed and can construct searches proficiently, Google is an useful tool. The problem is not Google itself but that students often lack information literacy, not knowing how to evaluate the validity of a website. A page that many people click on and with many incoming links may simply be popular and well developed, not factually accurate. An example in recent months is the rise of Wikipedia pages to the top or near the top of search results, because Wikipedia is students' second go-to resource. Students also need to be education

in the ethical, policy, and security aspects of on-line information (Lippincott 2005, 57; Oblinger 2008, 19-20; Cooper 2009). Deep reading of a single text remains an useful skill (Carr 2008).

As a counterbalance to some of these problems, Google created Google Scholar with the cooperation of higher education faculty and some database vendors (Lippincott 2005, 58). In contrast with Google, Google Scholar searches only scholarly publications (books from Google Books, academic articles, and citations). It returns a mix of sources and is thus highly flexible:

> It can function as a web-based scholarly search engine, a citation analysis tool, a portal to open access materials on the open web and in repositories, a connection to library journal subscriptions as well as book collections, and an adequate alternative in some cases to native subscribed databases or commercial federated search products. (Hartman and Mullen 2008, 211)

Not all databases, however, are searched by Google Scholar; its extent of recall depends on the databases and the discipline in question, Google Scholar being somewhat better in the sciences and medicine than in the humanities. (Neuhaus et al. 2006, 131, 138; Hartman and Mullen 2008, 215) Google Scholar has proved to be an useful source of academic citations, at least in some disciplines. (Neuhaus et al. 2006; Meho and Yang 2007) However, Google Scholar also lets some "unscholarly" sources through. (Taylor 2007)

As with other Google products, Google Scholar's level of functionality is low, especially in comparison to commercial academic databases such as EBSCO and Thomson/ISI. There are no authority lists or indexes of authors and contributory journals; Google does not reveal Google Scholar's sources. (Friend 2006; Neuhaus et al. 2006, 128; Hartman and Mullen 2008, 213) There is no provision for searching using subject terms (a controlled vocabulary). (Hartman and Mullen 2008, 213). One must click through to "Advanced Search" and "Scholar Preferences" to construct limited searches; Boolean operators and other limiters are not available on the main page. (Hartman and Mullen 2008, 213; Neuhaus, Neuhaus, and Asher 2008; Potter 2008, 19) Google Scholar does not enable easy sorting of results by author, journal or date. Its "Recent Articles" and "Since [date]" features are probably intended to enable sorting by date, but do not seem to operate properly. This low functionality makes Google Scholar's main page easy for

students to operate, but could alienate its main intended users, academic researchers; sifting through Google Scholar search results is very time-consuming.

Furthermore, many “hits” on Google Scholar are citations of articles in commercial academic databases. An institutional user finding such a citation would log into the library database access page to obtain access to full texts of the articles; Google Scholar is unlikely to put commercial academic databases out of business. (Mullen and Hartman 2006, 118). The long-term implications of Google Scholar for the academic publishing and database industries are not yet known; as the Neuhauses and Asher ask, " If a library is unable to afford Scopus or Web of Knowledge, can Google Scholar serve to fill the void?… If a library is only able to subscribe to a few online full text resources, does Google Scholar point to enough free open-access journals to satisfy library patrons?… Will Google Scholar place an increased burden on interlibrary loan systems?…Will Google Scholar remain free?…Will Google Scholar go away?" (Neuhaus, Neuhaus, and Asher 2008, 49)

Academic research libraries have been slow to incorporate Google Scholar into their web sites. (Mullen and Hartman 2006, 113-115; Hartman and Mullen 2008, 217) They have been reluctant to give the search engine the same status as commercial academic databases. But Google Scholar's recognition as an academic research tool has increased; "73 percent of all Research Institutions and one-third of all Master's Institutions provide Google Scholar-mediated link resolution from Google Scholar records to licensed full-text library resources." (Neuhaus, Neuhaus, and Asher 2008. 49)

Over the long term, as more quality academic information becomes digitally accessible, Google search and Google Scholar may improve further. Librarians in ARL libraries and scholars should collaborate with Google Scholar to improve its quality, especially by creating more open-access scholarly materials. (Mullen and Hartman 2006, 109-110; Neuhaus, Neuhaus, and Asher 2008, 49). Librarians and instructors also need to teach students how to use Google and Google Scholar, showing when Google Scholar is an appropriate resource and when library resources are appropriate; some university libraries offer Google workshops. (Villele 2007, 56, 60). Critical thought about Google's mission and quality is necessary (Potter 2008, 21-24). Finally, as Microsoft, Yahoo, and Amazon.com square off for war against Google, academic libraries would probably be advised to stay above the fray by promoting commercial federated

search services as alternatives to Google, and promoting open-access text archives that may have more staying power. (King 2008; Young 2008a)

Conclusion: "Good Enough"?

It is apparent that Google is only "good enough" for a partial set of the diverse information communities of higher education institutions. At present, the cloud services of Google Apps for Education are useful for students but do not meet the needs of academic or administrative computing or researchers. Should Google produce course management software, teachers and administrative IT departments would need to consider closely whether "Google Classroom" would serve the needs of all teachers and students. If cost is a factor -- and saving costs is crucial in today's economy -- university CIOs might be better advised to use open source software developed by educators as well as software engineers, in a transparent manner in accordance with educational standards. (Wheeler 2007)

Patterns of conflicting priorities among educational communities are becoming apparent. Students may be regarded as a body of consumers of university services, or as future workers. IT departments may be influenced by current business management models and emphasize greater efficiency, cost-cutting, and serving students' preferences. (As an extreme example, Thor 2006.) Going to Gmail would achieve all of these goals, saving money, meeting students' preferences, and merging this facet of the university with the high-tech world. Many university and college libraries would be greatly assisted by the Google Library, even if it means buying fewer physical books. They might be tempted to cut funding for academic databases that are increasingly neglected in favor of Google, Google Book Search, and Google Scholar. These are all "good enough" policies for institutions with the goal of preparing students for the workforce, not of promoting present research and educating future researchers.

On the other hand, higher education leaders in technology need to consider more than just pragmatic concerns. (Kelley and Sharif 2005: 35) Though Google Book Search and Google Scholar are useful in a broad-spectrum way for academic research and even for collecting citations, faculty and researchers would be poorly served by cutting funds for commercial academic databases and search services. Even if the Google Library Project terminals and institutional subscriptions become available, academic research libraries should continue to buy

the range of academic scholarly books and monographs, since such libraries also have a heritage function, conserving and preserving world literature and scholarship. This higher function is also promoted by digitization projects that emphasize quality over quantity and that allow greater linguistic processing and other manipulation of texts. Furthermore, higher education should promote greater information literacy in students than they would necessarily achieve by Googling. (Johnson 2007; Campbell 2006)

As Google amasses further information and as its academic users collaborate in producing more open-access information, that these conflicts could decrease -- assuming that Google continues to grow. However, Google is not in the education business. It is not an academic institution, which requires more transparency and the creation and monitoring of educational standards. It has emphasized quantity of access to information over quality, trusting in "the wisdom of crowds" to concentrate valuable information. Its goal of quantity over quality is directly related to its profit motive, making money through the advertising on its pages (though university student Gmail and Google Scholar pages do not have advertisements).

This is somewhat dismaying because of the trend in cloud computing and online education, which is likely to result in a further dispersal of any one college's or university's community. Students are becoming able to access, contribute to, and collaborate on documents and discussions from any location; they prefer on-demand information, self-guided learning, collaborative work, and digital access. (Oblinger 2008; Young 2008b) If they attend on-line classes, they are even less likely to visit campus to use campus libraries. Unless academic IT departments and libraries proactively promote higher-quality on-line services, students will depend on the Google Library Project (which they may be able to access remotely from an on-line portal) and on Google Scholar and plain Google search. They will in effect attend Google University.

Exhibit 1. An example of Google Book search for a work in the public domain. The first result is in copyright or without permissions; the next two give access to the full text. Google's keyword-focused text advertisements are displayed at right (with unintentional humor).

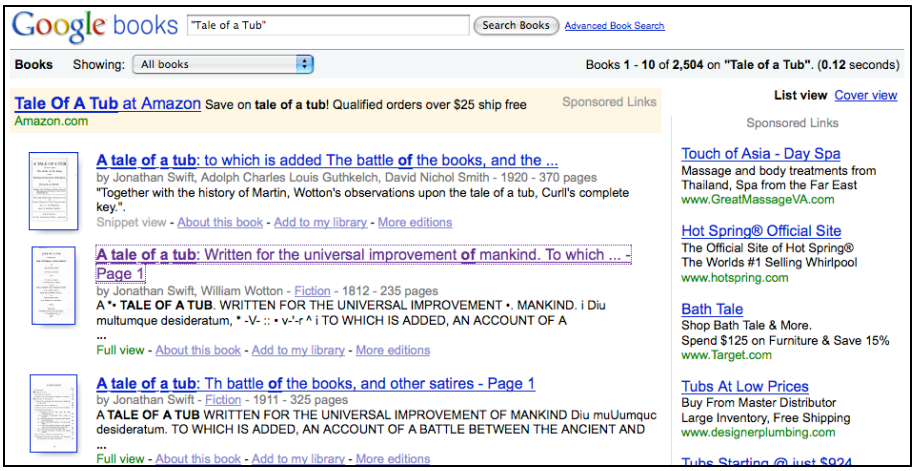


Exhibit 2. Example of a limited preview search result:

Exhibit 3: Example of snippet view of passages in an edition with no preview available:

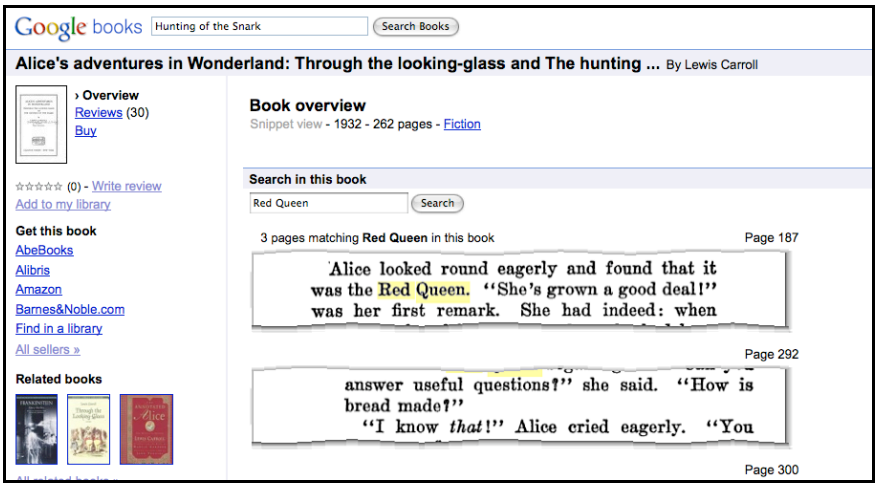
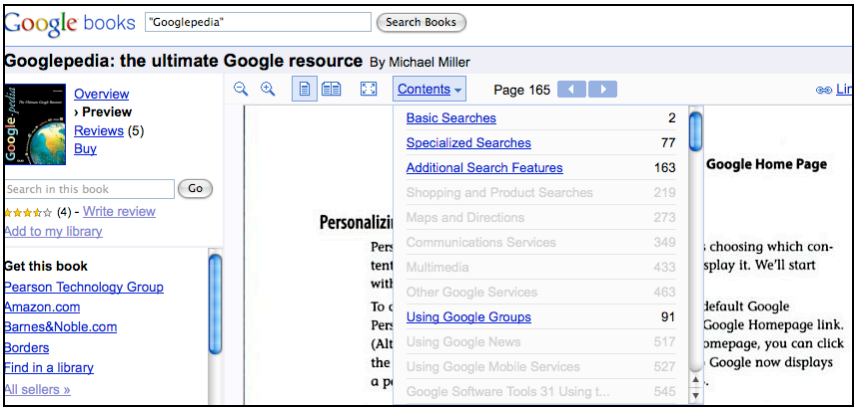


Exhibit 4. One example of how limited preview restricts access to the text. Here the first several chapters have complete access, but the others are omitted.



If you search for key words or phrases within a text, the limited preview operates differently, giving access to a limited number of pages adjacent to the pages containing the key word or phrase.

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