

Catalysts for Change: Information Fluency, Web 2.0, Library 2.0, and the New Education Culture

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Introduction

It is extremely difficult today to effectively track and fully understand how the vast amount and quality of information so readily available over the Internet is transforming the way we conduct research and acquire knowledge. It is also safe to say that educators are having an extremely frustrating time keeping up with the prevalent and growing overabundance of both cogent information and misinformation that today's web savvy students tap into on a daily basis online.

How can educators help today's students reach an acceptable level of "information fluency" that they can carry with them during their academic careers and beyond? The term information fluency is used here to mean the acquisition of three primary skills : basic information technology skills (including computer literacy), information literacy skills, and critical thinking skills. What do educators really need to know about information fluency and its relationship to the swelling flood of online-communication/sharing and web-based sources of information?

This paper is a synthesis of some of the recent literature that attempts to answer such questions. It includes the perspectives of many educators, garnered through in-depth telephone interviews, who are deeply interested in information fluency.

Perceptions of the Library and Information Resources

The Online Computer Library Center (OCLC) recently published a report that highlighted college students' perceptions of libraries and information resources. The report was generated through a blind survey conducted for OCLC by Harris Interactive on May 20 through June 2, 2005 that focused on how today's information consumer perceives libraries. OCLC wanted to see if information consumers believed that libraries mattered, and at what level, as well as whether or not library usage would increase or decrease in the future. The blind survey garnered 3,348 respondents, including 396 undergraduate and graduate students from six countries, age 15 to 57, and 621 14- to 17- year-olds mostly from the U.S. (labeled potential college students) whose responses became the basis for the report focusing on student perceptions of libraries and information resources.

Some of the results generated by the 396 college student respondents revealed that

- search engines are ranked as the first choice for information by 72 percent of colleges students;
- 2 percent use library websites as the source to begin an information search;
- when excluding search engines from this picture, college students typically learn about electronic information resources from friends (67 percent);
- more than half (53 percent) believe information from search engines is at the same level of trustworthiness as library information; and
- 36 percent use librarians to cross-reference information for validation, and more than 80 percent say that they use other websites with similar information as a validation tool, followed closely by teachers/professors (78 percent).¹

Some of the results generated by the 621 14- to 17- year-old respondents revealed that

- they use friends, relatives, library materials and librarians to cross-reference information for validation more so than today's college students do;
- 34 percent visit their public library at least monthly; and
- while they more readily use electronic resources than older respondents, only 20 percent of 14- to 17- year-olds who have used a library website completely agree it provides worthwhile information compared to 45 percent of college students who completely agree.²

OCLC has concluded that library resources, services, and information experts "appear to be increasingly less visible in a universe of abundant information." So, it is not surprising that even college students, who, according to OCLC, are most aware of the resources and services available to them through academic libraries, do not access such services as frequently as college students did in pre Digital Age years. The OCLC survey also suggested that "libraries have no monopoly on the provision of information," and that today's self-reliant students typically do not ask for help when using both physical or virtual library resources.

In short, OCLC determined that “it is time to rejuvenate the library brand, which is still strong in the category of books but needs to be made stronger in leveraging its brand to incorporate growing investments in electronic resources and library web-based services.”³

NetGeners

Responsible educators are always looking for ways to rejuvenate themselves to meet the needs of their most recent population of incoming students. Hence, looking at some of the characteristics espoused by those conducting research about today’s Net Generation (herein referred to as “NetGeners,” meaning young people who have grown up with the Internet) is a logical place to start building a framework and some context for answering questions about the information fluency capabilities and habits of today’s students. NetGeners have already started to enter higher education and also represent the near future of the majority of our traditional-aged higher education student population.

- NetGeners are incredibly articulate, are estimated to have Intelligence Quotients that are 15 to 20 points higher than Baby Boomers, and are being recognized as the smartest generation in history.⁴
- NetGeners with high SAT scores and who also do well academically in higher education typically graduate from school systems that have strong libraries.⁵
- NetGeners are multi-taskers who have grown accustomed to changing contexts seamlessly, and they expect this from others.⁶
- NetGeners use a “Nintendo” approach to learning by trial-and-error as opposed to conducting careful research.⁷
- NetGeners process information quicker than previous generations and can “make connections and recognize patterns easily instead of following linear thought patterns.”⁸
- NetGeners are accustomed to synchronously and asynchronously connecting with others worldwide and working in virtual teams, which has important implications related to how they access information and solve problems.⁹
- NetGeners see technology as a friend and not a foe, and it is recommended that educators al-

low them to create their own computer applications, information-oriented websites and business models.¹⁰

- NetGeners do not fear anything that is digital, are constantly connected to information and other people online or through their cell phones, do not read instructional manuals, and demand immediacy.¹¹
- NetGeners are social, but their connection to others does not have to be face-to-face; they frequently practice peer-to-peer learning through friends in their social network; and they prefer a lateral approach to learning as opposed to a hierarchical approach.¹²
- NetGeners read images much more easily and differently than generations before them. They are basically visual-based learners as opposed to generations before them who are text-based learners.¹³
- Because NetGeners have grown accustomed to rich media that has consistently kept their attention and entertained them since birth, they demand to be engaged in their learning and information-gathering environments. Otherwise they will shut their instructors out.¹⁴

Not So Tech-Savvy

NetGeners are very capable of communicating and sharing their interests online. They easily navigate their way through instant messaging, e-mail, social networks such as FaceBook and Friendster, online social bookmarking websites del.icio.us and BackFlip, image sharing websites Flickr and Zoomanga; and the currently fast-growing social video-feed website YouTube. However, their information technology savviness is often considered less than admirable by most higher education standards.

It is wrongheaded to think that undergraduates—because they have grown up in a digital age—are better at understanding the technology they use as it relates to researching information. They are at sea, drowning in a pool of information, looking for life preservers. Libraries have taken on the task for years of educating our undergraduate students, graduate students, and professors about where information resides, how to access it, and what can be done with it. This is the vestal flame of libraries,

and it is really an important task that can't be surrendered under the assumption that undergraduates know about this because they have grown up with technology.¹⁵

Engaging Students While Enhancing Their Information Fluency Skills

There are pockets of information technologists, instructional designers, faculty, librarians, and publishers throughout the country collaborating on projects that apply highly visual and interactive technologies and pedagogies to create innovative teaching and learning environments that engage today's modern students, as well as teach them information fluency skills. Such collaborations typically create "contained spaces" in a web-based environment comprised of reliable and focused collections of audio, video, interactive and/or still digital objects, and documents. These contained spaces also provide specialized search engine technologies and online access to extensive databases that link to full-text discipline-based articles and scholarly monographs. Using these contained spaces in face-to-face, fully online, and/or blended courses can help students gain information fluency skills at a faster rate and with greater traction than they would on the wild and chaotic web.¹⁶

One publisher that caters to libraries, for instance, uses the term (which it trademarked) "Semantic Indexing™" in a number of its highly organized and discipline-specific, subscription-based resources that have been created by teams of scholarly editors. Semantic Indexing is a "framework by which users can be guided to understand, explore, discover and learn," as "route maps guide users through data - saving time and effort."¹⁷

Virginia Center for Digital History

There is also a growing number of freely available, sophisticated online contained spaces that faculty and students can tap into without going through their academic library services. The Virginia Center for Digital History (VCDH), for instance, which was founded in 1998, continues to focus on "new forms of historical scholarship," through its creation of a variety of interactive history-related digital collections that are available to the public at no cost. As noted on its website, VCDH also "encourages the use of digital tech-

nologies for scholarship and teaching," by employing undergraduate and graduate students to explore using technology and to teach them what can be considered information fluency skills for producing digital projects. VCDH also participates in workshops for K-12 teachers to "help them integrate digital resources into their curriculum."¹⁸

The kind of work being accomplished at VCDH, along with other scholars in the humanities over the last two decades, has been tabbed "digital humanities." Their work revolves around experimenting with advanced technologies for discovering interpretations and creating new modes of scholarly communication.

They (digital humanities scholars and information technologists) have created large digital archives, complex hypertext narratives, and, in some cases, algorithmic programs, relational databases, and data mining systems. At the same time, the volume of digitization has exploded, as libraries, archives, and governments rush to move both historical and current data into electronic format. Despite these advances and some stellar projects in digital humanities, advanced computing technologies remain underdeveloped in the humanities, and there is opportunity for fruitful collaboration across disciplines.¹⁹

The educators involved with digital humanities are seeking to build a distributed infrastructure with software that can analyze and represent spatial and temporal relationships among numerous amounts of data, words, images, sounds, and billions of artifacts from diverse sources. The goal is to provide educators with the right tools and ability to access, retrieve, and process all of this disparate data into the creation of even more engaging and sophisticated contained spaces online.²⁰

INFOhio

INFOhio is another interesting case in point related to engaging students and educators (but in the K-12 sector) in conjunction with teaching them valuable information fluency skills.

INFOhio, a statewide cooperative school library and information network, uses technology to ensure curriculum and instruction of information literacy by providing greater access for Ohio's learners and educators. INFOhio's components include electronic re-

sources for schools, instructional development for teachers, library automation, media booking, and a statewide union catalog.²¹

One of INFOhio's latest developments is a "SchoolRooms" project that will provide a new, "student-friendly" online portal to a wide array of content from library catalogs, online databases, e-content from publishers, search engines, and teacher-selected websites. This content is presented in "virtual rooms that help students discover information." The INFOhio director noted that the SchoolRooms project will hopefully give students the ability "to discover information in a new and more engaging way." In addition to students, "teachers and librarians (as well as parents) will have access to a variety of high-quality resources from one easy and convenient search entry."²²

The editor-in-chief of the *School Library Journal* mentioned that the SchoolRooms project was basically INFOhio's way of keeping up with, and possibly surpassing, the quickness and ease of Google searching. He added that such new technology can help make information seeking more intuitive for students and hence the "least important skill we have to teach." More importantly, the focus will be on "what learners need to do with information: evaluate it, analyze it, reconcile different perspectives, and synthesize in into their own perspectives."²³

California Digital Library

A good example of cooperative library and information network at the university level can be found at the California Digital Library (CDL). As noted on the home page of the CDL:

The California Digital Library supports the assembly and creative use of the world's scholarship and knowledge for the University of California libraries and the communities they serve. In addition, the CDL provides tools that support the construction of online information services for research, teaching, and learning, including services that enable the UC libraries to effectively share their materials and provide greater access to digital content.²⁴

Beyond NetGens

When moving beyond the NetGens categorization into the total population of higher education students, other factors come into play concerning students' information fluency capabilities and habits. The "massification of higher education," for instance, relies on the notion that the federal government's authorization of financial aid grant and student loan programs, originating in 1965, and its expansion up through today, has resulted in a highly diversified and growing student body with a wide variety of information fluency capabilities and habits. In short, as more students enroll in higher education, faculty and librarians are exposed to the broader range of middle and high school preparatory programs where these students came from. While some come from school programs with excellent libraries and information technology services that support the development of students' information fluency skills, many others come from places where the school library, as well as the local public library, have been radically under funded. These incoming traditional-aged students do not always match up with the NetGens thus far described in this report. Moreover, there are other older generations of students who comprise a large and growing percentage of the total higher education student population and have yet another set of information fluency characteristics and habits quite different from the typical NetGener.

Web 2.0 and Library 2.0

When looking at the diversity of students by both age and academic preparation, it is easy to see that the entire higher education environment is in "flux," with academic librarians, faculty and administrators struggling with decisions about when and how to provide the appropriate levels of information fluency instruction.²⁵

Perhaps educators can discover what's needed to build effective and modern information fluency initiatives through the lenses of "Web 2.0" and "Library 2.0."

Web 2.0

A condensed definition of Web 2.0 is that it's simply a term for generating discussions that represent all of the very latest and reasonably foreseeable widespread functions and devices that

people utilize in an online modality. Web 2.0 holds the mechanisms and infrastructures for facilitating modern methods to create, share, publish and promote information. Think beyond e-mail and basic websites, to social networking, web services technologies, and the next iteration of blogs, wikis and pod casts.

Web 2.0 is about the more human aspects of interactivity. It's about conversations, interpersonal networking, personalization, and individualism. . . The emerging modern user needs the experience of the Web, and not just content, to learn and succeed. . . Web 2.0 is ultimately about a social phenomenon—not just about networked social experiences, but about the distribution and creation of Web content itself, characterized by open communication, decentralization of authority, freedom to share and reuse, and the market as a conversation.²⁶

Some fundamental principles of Web 2.0 include

- the practice of freeing up more data that was previously not available to the public;
- creating applications that are able to locate and assemble content that meets our needs, as opposed to conforming to the dictates of content owners and their intermediaries; and
- communicating and facilitating community, moving away from the web flowing content from provider to viewer to a more participative web in which content is user-generated and shared.²⁷

From another point of view, there are ten easy-to-understand themes that describe Web 2.0:

1. Organizing the Unorganized
2. Enhancing Consumer Choice
3. Empowering Individuals to Become the Media
4. Facilitating Constant, Cheap Communication
5. Sharing with Friends
6. Enabling a Multimedia Revolution
7. Making it Easier to Find and Spend Online
8. Democratizing Labor Markets
9. Breaking Down Geographic Barriers
10. Engaging Individuals in Conversation with the Powerful²⁸

Library 2.0

Combining Web 2.0 with Library 2.0 brings up some interesting viewpoints directly and indirectly related to information fluency. Similar to Web 2.0, Library 2.0 is just a term for generating discussions. It basically represents a myriad of viewpoints concerning how academic librarians can utilize Web 2.0 tools for disseminating information and for enhancing/modernizing their services. A senior analyst for Research Libraries Group researched this term and discovered 62 views and seven definitions of Library 2.0.²⁹

One widely accepted notion concerning the marriage of Web 2.0 and Library 2.0 is that

leveraging the approaches typified by Web 2.0's principles and technology offers libraries many opportunities to serve their existing audiences better, and to reach out beyond the walls and websites of the institution to reach potential beneficiaries where they happen to be, and in association with the task they happen to be undertaking.³⁰

Catalysts for Change in a New Information-Rich Culture

All the discussions, theories and initiatives of a Web 2.0/Library 2.0 world are influencing how information is disseminated and shared, and how knowledge is gained. All these elements are morphing into the early stages of what could be considered a vast and meaningful culture change in higher education that has educators thinking about information fluency in new ways. In this new education culture, the earlier noted ages and generation classifications and differences frequently applied to both students and educators may not be the prevalent catalysts of change. Instead, the catalysts for change in this new culture—some of which were alluded to when describing the characteristics of NetGeners—are defined within a wide variety of concepts, tools, and changing social habits. Let's take a closer look at some terms and concepts that apply to this new education culture.

Connectedness: The new bevy of web-based communications and information-sharing implements, beyond e-mail, are being used by more people of all ages every day to connect with each other. This “connectedness” includes a “peer-to-

peer movement,—aided by social software—that is growing in popularity and changing the hierarchy of information trust, spreading the acquisition of information and knowledge laterally among friends and friends of friends.³¹

Online social networks have become prevalent among higher education students. As noted in a recent *Inside Higher Ed* article, more than 7 million students from 2,600 colleges and universities use Facebook.com, an online directory that connects people through online social networks.³² These social networks are groups of people who can see each other's online profile. Facebook has networks for colleges, high schools, workplaces and geographic regions.

One way of describing the Facebook phenomenon is through the eyes of Forester Research, which reported that

easy connections brought about by cheap devices, modular content, and shared computing resources are having a profound impact on our global economy and social structure. Individuals increasingly take cues from one another rather than from institutional sources like corporations, media outlets, religions, and political bodies.³³

There are an estimated 200 social networking sites online today. From an information fluency perspective, students need to be aware that, while sharing information with each other over social networks has its benefits, publishing their profiles online could also have occupational hazards. Some students, for instance, unwittingly post information about themselves that allude to their drinking, sexual and/or gambling behaviors. There have been instances where such information has been accessed by prospective and current employers, law enforcement, and university officials, leading to negative consequences. So, students need to understand that their freedom to publish whatever they want online comes with responsibility, and recklessly posting information about themselves and others can have serious ramifications.

³⁴

Participatory environments: In addition to being connected online through social networks, people from all walks of life are employing other social software to form “participatory environ-

ments,” such as those found in the blogosphere.³⁵

Technorati.com is the authority on what's going on in the blogosphere. As of August 19, 2006, Technorati was tracking 51.6 million blogs. As noted on the Technorati website,

with an increasing number of people reading, writing, and commenting on blogs, the way we use the web is shifting in a fundamental way. Instead of being passive consumers of information, more and more Internet users are becoming active participants. This is why the blogging phenomenon and other forms of unfettered expression on the web is often called the rise of the participant economy.³⁶

How today's blogosphere relates to higher education and information fluency is a question that's in an early stage of exploration today. One development that influences how we find information in the blogosphere can be found through some relatively new blog search engines that enable searchers to find timely commentaries, customarily found on blogs, as opposed to the what might be found through typical search-engine results. Such new methods for finding information have made the boundaries around searching “fuzzier than those in the already fuzzy world of Web search.”³⁷

Social bookmarking is another participatory social software that has gained prominence with students and has obvious influence on the way information is discovered today. The earlier mentioned del.icio.us is the preeminent first-runner in this field. At del.icio.us, registered users can share their favorite websites by posting personal descriptions and tags. The website also includes methods and features for sharing and gaining access to the most prominent tags and finding related websites within specified interests.

There is something immediately gratifying about adding a description to a site one is interested in, being able to do so beyond prose sentences, and not having to look to an authority for ontological assistance.

Having found another del.icio.us user, one can check what else the other user has chosen to bookmark and share, thereby learning from a potentially kindred spirit. This is classic social

software, and a rare case of people connecting through shared metadata.³⁸

Numerous other variations of social bookmarking have popped up on the Internet, including three worth noting here:

- Connotea, an online reference management system for clinicians and scientists;
- CiteULike, for academics to share, store, and organize academic papers they are reading; and
- Squidoo, where anyone can build a “lens” website on any topic they are passionate about.

Distributed Cognition: Another way of defining the world of social software is to look at its social habits from a “distributed cognition” point of view. This is another example of the change happening within the hierarchy of information trust. Wikipedia, for instance shows how large numbers of people are mediating the creation and dissemination of vast amounts of encyclopedic information in an online environment. In short, there is intelligence out there in the vast network of people connected to the Internet that has enormous implications on everyone’s information fluency capabilities and habits.³⁹

What About Wikipedia?

Those who are avid Google searchers are more than likely noticing how references to Wikipedia are increasingly popping up on the first pages of their searches. This is having a profound effect on the way in which information is being discovered, and it is obviously another culture change worth noting. Many educators, especially librarians, are questioning the validity of Wikipedia as a primary resource for anything. Understanding how Wikipedia works has become an important information fluency skill.

In a recent issue of *The New Yorker Magazine*, Stacy Schiff wrote an informative feature article about Wikipedia that should be read by anyone who uses this source for any kind of information-gathering purposes. Schiff’s article starts with some interesting background information about Wikipedia being a non-profit organization with only five employees, and “the seventeenth-most-popular website on the Internet, generating more traffic daily than MSNBC.com and the online ver-

sions of the *Times* and *Wall Street Journal* combined.” Wikipedia entries, which exist in 200 languages, are created by hundreds of thousands of contributors worldwide. In March 2006, Wikipedia had recorded one-million articles, which was more than four times the 120,000 entries in the *Encyclopedia Britannica*.⁴⁰

The short definition of Wikipedia is that it is a free online encyclopedia with entries created by everyone and anyone that can be edited by everyone and anyone. It is loaded with uninformative, error-ridden and narrow-minded entries, as well as plenty of highly informative, valid, and very timely information that traditional encyclopedias do not have.

It was explained in the *New Yorker* piece that this open-editing format has caused more of its fair share of “edit wars” in which entries get changed and re-changed and errors come and go. Consequently, since Wikipedia launched in 2001 it has increased the number of rules, guidelines, and governance of how information becomes live on Wikipedia. For instance, Wikipedia now has an arbitration committee that rules on entry disputes, and “five robots troll the site for obvious vandalism, searching for obscenities and evidence of mass deletions, reverting text as they go.” Still, many violations require human interventions. Plus, arbitration and/or human intervention to correct inaccuracies does not happen over night. One important case over a global warming entry, for instance, took three months to arbitrate.⁴¹

Overall, the *New Yorker* article painted an ambiguous picture of Wikipedia. On one hand it was reported that a well-known Harvard philosopher called a Wikipedia entry comparable to the *Stanford Encyclopedia of Philosophy*. On the other hand it was explicitly stated in the article that

Wikipedia remains a lumpy work in progress. The entries can read as though they had been written by a seventh grader: clarity and concision are lacking; the facts may be sturdy, but the connective tissue is either anemic or absent; and citation is hit or miss.⁴²

Other Catalysts for Change

Additional catalysts of change that fall under the banner of Web 2.0 and Library 2.0 and may or may not fall specifically under the concepts of con-

nectedness, participatory environments, and distributed cognition, or perhaps overlap in some ways, are hybrid news and social software services, RSS feeds, alternative realities, and what can be called the age of Google. All of these, too, influence cultural change in higher education and has educators thinking about information fluency in new ways.

News and Social Software Combined

“It is only logical that crossbreeds of news and social software have emerged.” Two examples are Memeorandum, which lists links to the latest news alongside related opinions from blogs, and, Digg, which accepts articles from its community of users who then vote on what stories they like best. The stories with the most “diggings” are posted on the front page of the Digg website. “Such projects, taken together with Wikipedia, represent the acme of social software as information production and aggregation.”⁴³

RSS Feeds

Utilizing Rich Site Summary (RSS) technology is another way of obtaining information more tailored toward an online user’s individual preferences. Many blogs and other content providers, including a wide and growing number of publishers, for instance, have a small RSS icon, usually orange-colored, on the front page of their website that lets visitors know that an RSS Feed is available to them. When a visitor signs up for a feed, and installs an RSS reader on his or her computer, the feed will send the reader regular updates from the original content source.

Signing up for RSS feeds basically allows users to manage the flow of information they peruse through their web browser. RSS technology is another information fluency tool that influences the way people find information related to their personal interests. It is also gaining ground quickly for creative use by higher education faculty and academic librarians. Today, for instance, the American Library Association has an RSS feed for its current press releases, news stories from *American Libraries Magazine*, and its blogs.⁴⁴

Podcasting

Educational podcasting, which fits under the topic of mobile computing, is another growing field

and method for disseminating information in the Web 2.0/Library 2.0 world. Professors, particularly in fully online or blended learning environments, are converting their lectures into podcasts that students can access via their MP3 player, phone or computer. Academic librarians are also experimenting with podcasting for library instruction, seeing the value of this kind of technology for teaching information literacy skills to off-campus students.⁴⁵

Alternative Realities

Virtual reality games and learning environments are not just for young people, as a growing number of adults actively participate in alternative, virtual worlds for entertainment and for learning. The adoption of such technology is no longer a trivial matter.⁴⁶ Participating in virtual learning environments that are driven by innovative new “3D immersive technologies,” such as those created by Croquet, ActiveWorlds and Second Life, has great potential for enhancing one’s information fluency capabilities, especially as related to the latest developments in computer literacy.

The Age of Google

The following is posted on one of Google’s “corporate information” pages:

Over time we’ve expanded our view of the range of services we can offer—web search, for instance, isn’t the only way for people to access or use information— and products that then seemed unlikely are now key aspects of our portfolio. This doesn’t mean we’ve changed our core mission; just that the farther we travel toward achieving it, the more those blurry objects on the horizon come into sharper focus (to be replaced, of course, by more blurry objects).⁴⁷

Google has created some innovative tools in recent years. Overall, it can be considered the most influential catalyst for change in our new information fluency/Web 2.0/Library 2.0 world, just for its search capabilities alone. But, as already noted, Google has become much more than searching. Click on the “more” link at the Google front page to access the list of beta projects that keeps grow-

ing longer. There's Google Scholar, Google Video, and Google Blog Search, for instance, and tools to "communicate, show and share," such as Blogger, Picasa, and Google Groups.

Perhaps Google's most ambitious beta project to date is "Google Book Search," which has the goal of creating "a comprehensive full-text searchable database of all the world's books." While this project has generated lawsuits related to copyright infringement that have yet to be fully resolved, and may not be for who knows how long, Google has entered into partnerships to digitize plenty of books, including the full-text index of seven-million books from the libraries of the University of Michigan, Harvard, Stanford, Oxford, the University of California, and the New York Public Library.⁴⁸

In the meantime, conducting a Google Book Search today already helps users discover new and old books as well as read limited previews of their discoveries, if the publisher or author has given Google permission through its partner program. How this, as well as all of Google's latest beta projects, will affect higher education and the world of information fluency is currently in an early exploration phase among educators.

The "Long Tail"

All of the aforementioned catalysts for change, in combination with other new media developments, such as the latest video and imaging technologies, TiVo, hand-held advancements, and more, are allowing people to self-create and push-button control individualistic learning and entertainment environments. The enormous amount of choice for downloading audio, video and text-based files to computers, MP3 players, ipods, cell phones, and PDAs, gives people more control over the digital files they want, when they want, without having to go through some brand-name, centrally-controlled commercial enterprise. The end result is that individuals today have much more control over their time and more self-power and choice in meeting their knowledge and information acquisition and entertainment needs.⁴⁹

The growth of eLearning, for example, also reveals how students and faculty are increasingly seeking ways to manage their time inside more flexible, web-based teaching and learning environments. Plus, actively participating in an

eLearning environment is a great way to build up one's information fluency skills.

The bottom line is we live in a world of abundant choice where you can find just about anything you want online, including almost every obscure book, article, and song created; a formally unimaginable choice of for-sale items on eBay; a wide variety of elearning opportunities of vastly different quality; and an infinite amount of content, products and services being offered by niche, relatively unknown businesses and amateurs that nobody can effectively track or fully understand. This multitude of choice, when aggregated, is referred to as the "Long Tail," a term first brought to the forefront in an article published in *Wired Magazine* in October 2004⁵⁰ and recently published in a book that shot up into the bestseller lists quickly.⁵¹

The theory of the Long Tail can be boiled down to this: Our culture and economy are increasingly shifting away from a focus on a relatively small number of hits (mainstream products and markets) at the head of the demand curve, and moving toward a huge number of niches in the tail. In an era without the constraints of physical shelf space and other bottlenecks of distribution, narrowly targeted goods and services can be as economically attractive as mainstream fare.⁵²

Put in another way, these days our watercoolers are increasingly virtual—there are many different ones, and the people who gather around them are self-selected. We are turning from a mass market into a niche nation, defined now not by our geography but by our interests.⁵³

What does this have to do with higher education and information fluency? For one, there is a Long Tail of scholarly information available on the web, especially when one considers just what's available in the academic-oriented blogosphere alone. Secondly, academic libraries have always served the Long Tail niche marketplace by providing their patrons with access to deep, historical collections; interlibrary loan document delivery services; hard-to-find scholarly articles and monographs; and more, that are available through

their extensive online databases. Such resources are not-so-available via Google.

In addition, librarians and faculty have and always will be experts at filtering out the noise so prevalent in the Long Tail of information so readily available to us today. However, as one librarian noted, “librarians shouldn’t kid themselves that people are sitting around their keyboards, unable to find what they need just wishing that a librarian was there to help them. People are actually thinking, ‘I wish everything worked like iTunes and NetFlix.’”⁵⁴

The Notion of Filters

Somewhere between students finding whatever they want with ease online and the basic information fluency requirement they need to conduct valid, scholarly research via their academic libraries is the “Filters Rule,” or, put another way, the “Recommendation Rule,” espoused in the Long Tail book:

We are leaving the Information Age and entering the Recommendation Age. Today information is ridiculously easy to get; you practically trip over it in the street. Information gathering is no longer the issue—making smart decisions based on the information is now the trick. Recommendations serve as shortcuts through the thicket of information.⁵⁵

To put it simply, while more information choice is good, presenting it in a way that organizes it, instead of confusing it, is better.⁵⁶ Librarians and faculty have always done this, but today, within the new dimensions of Web 2.0 and Library 2.0, the landscape has changed. In short, the nature of the information resources you need to succeed within any specific discipline have changed. But how students use information, make wise choices, and cite information properly are the same.⁵⁷

Creating More-User-Friendly Environments

The large database, content aggregators, and publishers that service libraries, e.g. EBSCO, Gale, ABC-CLEO, ProQuest, etc., face the challenge of making their interfaces, search functions, and navigational features easier for students and educators to use. These aggregators see search engines, such as Google, and collaboratively created

content websites such as Wikipedia, as both a blessing and bane. For one, Google and Wikipedia have made people familiar with accessing the web to retrieve content from a database. On the other hand, the ease of use of Google and Wikipedia have changed peoples’ standards of belief to one where they will more readily accept the instant, easily accessible, fast result to their information inquiry found online over the more difficult and complex library database search. The University of Michigan library, for instance, has an overwhelming 700 databases available to its students.⁵⁸

Some of the developments in the field that attempt to meet challenges related to making database searching and navigation easier include the further evolution of controlled vocabularies and OpenURL technology.

A controlled vocabulary is a carefully selected list of words and phrases, which are used to tag units of information so that they may be more easily retrieved by a search. The terms are chosen and organized by trained professionals (including librarians and information scientists) who possess expertise in the subject area. Controlled vocabulary terms can accurately describe what a given document is actually about, even if the terms themselves do not occur within the document’s text.⁵⁹

OpenURL is a type of URL that contains resource metadata for use primarily in libraries. The OpenURL standard is designed to support mediated linking from information resources (sources) to library services (targets). A “link resolver”, or “link-server”, parses the elements of an OpenURL and provides links to appropriate services as identified by a library. A source is generally a bibliographic citation or bibliographic record used to generate an OpenURL. A target is a resource or service that helps satisfy user’s information needs. Examples include full-text repositories; abstracting, indexing, and citation databases; online library catalogs; and other Web resources and services.⁶⁰

A Shift in the Way Academic Libraries Do Business

While the businesses that service academic libraries continue to work on the development of

new filtering and recommendation-oriented technologies to make academic library online interfaces and functions easier to manage and navigate through, the academic librarians themselves are seeing enormous change in the way they serve their patrons.

Today's academic librarians are being tasked with

- developing more sophisticated information fluency initiatives,
- having a keener understanding of increasingly complex licensing and copyright agreements with publishers and aggregators as they continue to build large digital resources,
- constructing the appropriate web portal architecture for patrons to easily navigate around, and
- recognizing and getting a better understanding of the workings of information technology and campus computing departments.

Moreover, keeping up with the Web 2.0/Library 2.0 worlds is certainly a tall task. Plus, many academic libraries have the additional responsibility of meeting challenges that are typically the result of inadequate resource allocations that stress library management on both the human and technology sides.

In her inauguration speech at the 2006 American Library Association (ALA) conference, 2006-07 ALA President Leslie Burger said:

Librarians and libraries have already been through a decade of great change spurred by a technological revolution that has changed the way in which we do business. We are hard at work trying to transform reference service, our catalogs, our approach to customer service, our buildings and our collections. Some of our staffs are tired and burned out on change. We've been so busy dealing with these changes, that we haven't always done a good job of communicating them. How many of our users know what a 'database' is? And how many of us can tell them in 10 words or less? Now is not the time to stop.⁶¹

The professional expectations of librarians have shifted. At one level, they have to understand all

the new tools; the new databases; the new searching capabilities; the new bibliographic management software; the new ways of assessing and teaching information literacy skills; the broad and differentiating backgrounds of their students' information literacy skills; and the rise of new pedagogies, with labels such as "active learning," "resource-based learning," and "inquiry-based learning" that involve the student getting more directly involved with information resources. At another level, librarians have to be more proactive than they have been in the past. Librarians are at an early-stage of discussion that places an emphasis on its proactive leaders needing to speak powerfully, persuasively, and credibly about student learning outcomes, along with being capable of working with colleagues across-campus to help faculty make modern information literacy instruction part of their teaching.⁶²

Embedding Information Fluency Across the Curriculum

In a March 2006 blog post hosted by the Association of College and Research Libraries (ACRL), an information literacy instruction slant was attached to the topic of Library 2.0 and its relationship to Web 2.0:

In a 2.0 approach, information literacy instruction is integrated across the curriculum. The library serves as an instructional center on campus and as the hub for a campus-wide commitment to preparing students with the information skills needed for success in the 21st century. Assessment of student learning benefits from its integration into campus activities that foster input and interaction from student and faculty library users. . . And, yes, you might meet those goals using an online course environment, a Web-based learning object, and an interactive tutorial, but those are simply the tools.

Likewise, it is very 2.0 to integrate information literacy instruction into campus educational opportunities outside the classroom, e.g., residence hall and Greek life education, and as part of staff development and faculty development programs sponsored by units such as Human Resources and the Center for Teaching Excellence. Both foster integration, inter-

action, user feedback, and permeable boundaries between library and other campus services—the very heart of the Library 2.0 concept; the heart of the library as an open system.⁶³

Librarians, information technologists, faculty and administrators are coming together, realizing that the new culture of education—influenced by information fluency initiatives, Web 2.0 and Library 2.0—can impart much more than the skills students need to get them through their academic careers.

Information fluency skills aren't limited to the academic environment. It may be that students do not need to have a strong understanding of how specific information-resource tools work—because the tools change so quickly today. However, having a basic understanding of how information is created; how information is communicated; and what's needed to manage, evaluate, synthesize and present information—whether they be a person's work life, personal life or academic life—“this goes on forever.”⁶⁴

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