HOW TO FIND VALID, AUTHORITATIVE & TRUSTWORTHY INFORMATION OVER THE INTERNET

A Guide to Becoming Information Literate

by George Lorenzo

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Preface

This relatively short ebook can be of great value to students of all ages who need a quick and easy read about how to find valid and authoritative information on the Internet. We are living in a digital age of mass confusion that is driven by our inablity to find and recognize information online that we can trust. This ebook shows you how to discern the good information from the bad information. In one sitting, the reader should learn how to identify whether or not the information they are reading through an Internet connection is the kind of information that they can feel confident is honest and useful or dishonest and useless.

Chapter 1: What is This World Wide Web?

It's hard to believe that not so long ago in the late 1960s and early 1970s we consumed our news from only three major television networks and our local newspapers. Our primary communication device was a black rotary telephone, and many of us had party lines that we shared with other folks in the neighborhood. If you happened to share a line with a loquacious neighbor, you were unable to get an open line until that person's long conversation ended. One of my friends grew up in a relatively poor neighborhood where the telephone booth on the corner served as the primary communication device for a number of families on the street where he lived. "Hey, Mister or Misses so and so," a fellow neighbor, who happened to be within close proximity to the booth, would shout from across the street, "there's a telephone call for ya!"

For entertainment, television held the main stage, with non-violent, non-sexually-oriented shows such as "My Three Sons," "Leave It to Beaver," "Father Knows Best," "Captain Kangaroo," "The Ed Sullivan Show" and "Mitch Miller" attracting our eyeballs and undivided attention. There were a lot of viewing choices, but shows like these were enough to keep us happily entertained. We also had full-color comic books for our fantasy reading pleasure. And game playing was the real stuff held outdoors in the fresh air and sunshine (or lack thereof – I grew up in Buffalo, NY) of any season.

When we conducted research for homework, we utilized a dictionary, and, if we were from a reasonably well-off family, we may have had a lovely set of encyclopedias to draw knowledge from. In those days, a door-to-door encyclopedia salesperson could make a decent living. At my house, we had a half-set of Funk & Wagnel's – up through the letter J – that my mother purchased piecemeal at a discounted price from the local grocery store. I remember these 12 or so volumes actually serving us pretty darn well in times of knowledge needs, despite being short sighted in its entirety.

Our homework assignments, of course, were typically composed with pen or pencil on paper. As we learned how to type, assignments were composed on manual typewriters with a special gray eraser nearby. And those who happened to have an electric typewriter at home were considered on the cutting edge of high technology.

Seems like the sixties and seventies were the "Stone Age." Yes, to state the obvious, things, indeed, have changed dramatically since those relatively uncomplicated days. For a contrast beyond what we ever could have imagined just take a look at the "connected" teenager of today, the so-called Net Generation that has grown up with the Internet.

Somewhere between e-mail and BitTorrent, we all had to leave our text-based world and enter the new world of information and communications technology (ICT). As our kids enter chat rooms, text message each other and talk on cell phones, play in virtual environments, and post their souls on social networking sites, us older text-oriented adults have had to learn how to deal with and monitor a new information and communications order (or disorder, depending on where you sit and think) unlike anything we have ever seen before. And with this change has come some interesting reactions that deserve our attention.

Fearing the Different
Henry Jenkins, author, professor and founder and director of MIT's Comparative Media Studies Program, explains how many parents, for instance, are frightened by the implications of their children growing up in a world that is very different from the world they grew up in. Parents who were raised during a time in which Facebook did not exist often react instinctively or emotionally, rather than intelligently, to such social networking issues and challenges. As Jenkins notes, dealing with Facebook does not allow parents to fall back on those tried and true responses that originated from those child-raising theories and concepts of the past.

"It is one of a dozen things you have to formulate a response to every day, and you are stressed out about it," Jenkins says. "So, you see some sensationalistic report on a cable news channel that pumps up the fear that kids are at risk when they go on Facebook. It hits at a very visceral level, and you are afraid that you can't adequately protect your child. So you put pressure on the schools and political leaders to stop it."

Jenkins was referring to the Deleting Online Predators Act (DOPA), a measure that, to the horror of Internet geeks everywhere, the House of Representatives passed in 2006. Fortunately, it failed in the Sen-

ate. Another DOPA bill was introduced to the House in early 2007, and again it was never enacted. DOPA required schools and libraries to block access to a lots of wonderful, interactive web content, including "websites that let users create web pages or profiles or offer communication with other users via forums, chat rooms, e-mail or instant messaging."

In effect, DOPA would have completely blocked students from going to any social networking websites, such as wikis and blogs, as well as prevented them from using e-mail and instant messaging on any of their school's Internet-connected computers. Pretty much anything on the web that is interactive would not be accessible. Jenkins called this kind of legislation "totally out of wack" and "ill conceived." Why? Because DOPA was an unfortunate irrational response to today's digital age. Rather than supporting our teachers and librarians in a quest to assist young people with applying rational, safe and practical ways for using ICT, we were saying let's close and lock the library doors, Jenkins notes.

The Noise Factor

DOPA is only one example of how "noise" has always surrounded the worldwide adoption of innovative and new ICT. By noise, I mean "incomprehensibility resulting from irrelevant information or meaningless facts or remarks," as defined by WordNetSearch, an online lexical database of English, developed under the direction of George A. Miller, distinguished Princeton University professor emeritus. I also refer to the 2e definition of noise from Merrian-Webster's Collegiate Dictionary, 11th Edition: "Irrelevant or meaningless data or output occurring along with desired information."

In short, the DOPA reaction was full of "incomprehensibility" on the part of its supporters who did not understand that ICT was here to stay; that our children will need to acquire the fullest understanding and keenest abilities when using ICT throughout their lives in order to compete effectively in a global economy; that even with the overabundance of "irrelevant and meaningless" web content out there today, there is also plenty to be desired. It is all accessible from the tip of our fingertips pressing on buttons that connect us to the web and enable us to trade and distribute valid information for the benefit of every web citizen.

Yet, many web surfers do not know how to navigate through all the noise in order to find authoritative and trustworthy information. Learning how to find and analyze the kind of information that can help us solve problems and challenges, answer our deepest questions, and perhaps bring about positive change in our culture and politics is what every web-savvy and responsible citizen needs to pursue more ardently than ever before.

As this ocean we call the web continues to expand ferociously into something we cannot predict, two elements of the web are certain: On the pessimistic side of life, there's a strong cross current that floats garbage, misinformation, and lies. And, on the optimistic side of life, there's another strong cross current containing gifts of knowledge, useful information, and the possibility for valuable interactive connectedness. Being able to find and consistently surf the latter cross current and stay balanced - and thus avoid the noise - is a skill-set that requires hard and patient work, good critical thinking and, to use a popular Beatles' phrase, "a little help from my friends."

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Chapter 2: Information Literacy

In the halls of academia, and especially in the halls of college and university libraries, "information literacy" is the term most often used to define our ability to find and collect authoritative and trustworthy information and then effectively share it with others. How do we become skilled at finding, evaluating and using information we find on the Internet in positive ways? As lifelong citizens of the Information Age, the answer to this question seems to grow in complexity every day. The complexity comes from the two aforementioned cross currents playing out in numerous new and varied forms of information dissemination that change as quickly as they are born. Today, in our modern digital age, we look at, and/or participate in, blogs, wikis, video logs, podcasts, listservs, discussion forums, social networks, social bookmarks, PowerPoints, webinars, instant messaging, text messaging, RSS feeds, citizen journalism, scholarly journals and abstracts, search engine results, websites with reader-recommended news, new and rapidly growing forms of ubiquitous computing and a host of other portals to information and online communication tools. That set of encyclopedias that we learned how to trust not so long ago has crumbled into dust.

Peter Morville, an information architecture consultant for companies such as AT&T, IBM, Microsoft and Yahoo, and author of a really good book titled "Ambient Findability: What We Find Changes Who We Become," says we are going through a transition period, and it is anyone's best guess as to how long this transition will last.

"I think back when I was a kid and I had my single-volume encyclopedia," Morville explains. "It was a wonderful resource, and it had a really nice feeling that if you had any question you could just look it up in your book. To some degree the whole traditional K-12 education system was oriented that way, with this notion of one authority and one history. I went through my education system with this idea that I was learning the one truth. Now many of us are in this period of transition where we are exposed to many different perspectives, many truths and many resources, so much so that it can feel overwhelming."

So, what can we do about it? The straight-to-the-point answer is to become information literate; in other words – as defined by the Association of College and Research Libraries (ACRL) – learn how to

"recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information."

A more complex answer is that, in addition to becoming information literate, we need to become visually literate, new-media (or Web 2.0 and Web 3.0) literate, and information fluent – or to put everything under one banner, we can simply call it 21st century literacy. Let's take a deeper look.

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 literacy that they can carry with them during their academic careers and beyond? 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?

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The Online Computer Library Center (OCLC) 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 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
- as noted in a companion piece to the OCLC report, written by DeRosa et al, 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).

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.

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. DeRosa et al, added that 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."

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Chapter 4: 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 literacy capabilities and habits of today's students. NetGeners have become the majority of our traditional-aged higher education student population. Below is a glimpse of what they look like:

- NetGeners are multi-taskers who have grown accustomed to changing contexts seamlessly, and they expect this from others, notes information literacy researchers from the University of Central Florida
- NetGeners use a "Nintendo" approach to learning by trial-and-error as opposed to conducting careful research., writes Tricia Bisoux in an article titled "Rethinking IT."
- NetGeners process information quicker than previous generations and can "make connections and recognize patterns easily instead of following linear thought patterns," writes Mark Prensky in "Digital Natives, Digital Immigrants."
- 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, Prensky adds.
- NetGeners see technology as a friend and not a foe, and it is recommended that educators allow them to create their own computer applications, information-oriented websites and business models, writes Prensky.
- 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, writes Diana Oblinger, president of EDUCAUSE, an international nonprofit association whose mission is to advance higher education.
- 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 lat-

eral approach to learning as opposed to a hierarchical approach, Oblinger adds.

- 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.

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, notes Prensky in "Engage Me or Enrage Me," published in the EDU-CAUSE Review.

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,online social bookmarking websites, image sharing websites, and through social video-feed websites such as 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," says William Thomas, founding Director of the Virginia Center for Digital History at the University of Virginia. "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."

Engaging Students While Enhancing Their Information Literacy 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 literacy 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 literacy skills at a faster rate and with greater traction than they would on the wild and chaotic web, Thomas explains.

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Chapter 5: Some Examples of Digital Scholarship for Teaching

There are a growing number of freely available, sophisticated online contained spaces that faculty and students can tap into. The Virginia Center for Digital History (VCDH), for example, 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 technologies 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."

The kind of work being accomplished at VCDH, along with other scholars in the humanities over the last two decades, falls under the banner of "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," Thomas explains. "At the same time the volume of digitization has exploded, as libraries, archives, and governments rushed 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."

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, Thomas adds. 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.

INFOhio

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

As noted on its website, "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 resources for schools, instructional development for teachers, library automation, media booking, and a statewide union catalog."

One of INFOhio's developments has been its "SchoolRooms" project that provides 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."

The editor-in-chief of 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."

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 in digital content."

Beyond NetGeners
CDL, Ohionet and VCDC don't even scratch the surface of what's being digitized today. When moving beyond the NetGeners 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 NetGeners 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 literacy characteristics and habits quite different from the typical NetGener.

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Chapter 6: 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 literacy instruction, says Scott Walter, a professor of Library Administration at the University of Illinois, Urbana-Champaign.

Educators can discover what's needed to build effective and modern information fluency initiatives through the lenses of what has been commonly referred to for almost a decade now, namely "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, pod casts, and online video.

"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." writes Stephen Abram in ImakeNews. Inc.

According to Chip Griffin in "10 Ways Web 2.0 Promised to Change the Way We Live and Work,"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.

Walt Crawford in "Library 2.0 and Library 2.0," shows ten easy-to-understand themes that describe Web 2.0:

- Organizing the Unorganized
- Enhancing Consumer Choice
- Empowering Individuals to Become the Media
- Facilitating Constant, Cheap Communication
- Sharing with Friends
- Enabling a Multimedia Revolution
- Making it Easier to Find and Spend Online
- Democratizing Labor Markets
- Breaking Down Geographic Barriers
- Engaging Individuals in Conversation with the Powerful

Library 2.0
Combining Web 2.0 with Library 2.0 brings up some interesting views directly and indirectly related to information literacy. Similar to Web 2.0, Library 2.0 is just a term for generating discussions that, in this case, represent a myriad of viewpoints related to how academic librarians can utilize Web 2.0 tools for disseminating information and enhancing/modernizing their services.

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," writes Paul Miller in "Web 2.0: Building the New Library."

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Chapter 7: Catalysts of Change
in a New Information-Rich Culture

All the discussions, theories and initiatives of the Web 2.0/Library 2.0 worlds 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 literacy 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 of 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.

Connectedness: The new pack 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, Oblinger says.

Online social networks have become prevalent among higher education students. 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."

There are plenty of social networking sites online today. From an information literacy 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.

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 environments," such as those found in the blogosphere.

Technorati.com is the authority on what's going on in the blogosphere. 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."

How today's blogosphere relates to higher education and information literacy is a question that's still in an early stage of exploration today. One development that influences how we find information in the blogosphere can be found through 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," writes Bryan Alexander in the EDUCAUSE Review.

Social bookmarking is another participatory social software that has gained prominence with students and has obvious influence on the way information is discovered today. Delicious is an early adopter in this field. At delicious, registered users can share their favorite websites, with 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," Alexander notes.

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. Wikiipedia, 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 every-one's information fluency capabilities and habits, Oblinger explains.

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Chapter 8: 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 obviously another culture change worth noting. Many educators, especially librarians, question the validity of Wikipedia as a primary resource for anything, and understanding how Wikipedia works has become an important information literacy skill.

In an 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-proftit organization with only five employees, and "the seventeenth-most-popular website on the Interent, generating more traffic daily than MSNBC.com and the online versions 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.

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 inac-

curacies does not happen over night. One important case over a global warming entry, for instance, took three months to arbitrate.

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."

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Chapter 9: Other Catalysts of 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 connectedness, participatory environments, and distributed cognition, or perhaps overlap in some ways, are hybrid news and social software services, RSS feeds, alternative realties, and what can be called the age of Google. All of these influence cultural change in higher education that has educators thinking about information literacy in new ways.

News and Social Software Combined

"It is only logical that crossbreeds of news and social software have emerged," Alexander says. 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 "diggs" 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."

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 literacy 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.

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, writes Michael Lorenzen in "Podcasts Lectures for uni Students."

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. Participating in virtual learning environments that are driven by innovative new "3D immersive technologies" has great potential for enhancing one's information fluency capabilities, especially as related to the latest developments in computer literacy.

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Chapter 10: The Age of Google

The following was 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)."

Google has created some innovative tools in recent years. Overall, it can be considered the most influential catalyst of change in our new information fluency/Web 2.0/Library 2.0 world, just for its search capabilities alone. But Google has become much more than searching.

One of Google's ambitious projects 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, explains Bob Thompson in "Search Me?: Google Wants to Digitize Every Book. Publishers Say Read the Fine Print First."

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 also in an early exploration phase among educators.

Our Over Reliance On Google?
A key word in the earlier-noted ACRL definition of information literacy is "evaluate." To begin with, any good educator – including librarians who typically do not get the recognition they deserve for being

educators – will explain that building a person's ability to evaluate information entails addressing what it means to be a critical thinker.

A good question to start with is have we become overly reliant on Google? Many academic librarians and others who analyze and report on search engine technology say that using Google as a primary source of information has major drawbacks and negative consequences. In short, the overuse of Google can decrease one's ability to conduct valid, full-bodied and meaningful research.

Seth Maislin, an information architect, explains that "the flaw lies in Google's strength: social algorithms." Maislin's point is that Google's page-ranking system is influenced by networks of links. It basically rewards those websites that have the largest number of other websites that link to them, regardless of the quality of content. Maislin, for instance, explains how, at one time, the Google search results for the word "Jew" typically resulted with the number one listing being a website known as JewWatch.com, which happened to be an offensive and inflammatory collection of antisemitic content. In his blog, Maislin elaborated: "This happened because a large number of supporters of this site tended to build links to it; then, those who were outraged or amused also linked to it within their protestations. In the end, the social algorithms at Google recognized how popular (i.e., "linked to") this site was, and in response rated it very highly – in fact, rated it first – compared to all other websites with the word "Jew" in the title. Eventually, those who were enraged by this content fought back by asking as many people as possible to link somewhere else – specifically, the Wikipedia definition of Jew. Over time, more people linked to Wikipedia than to JewWatch, and so the latter dropped into second place at Google. This process of building networks of links in order to influence Google's social algorithm is called "Google bombing." In other words, when the people who hated the site acted together in a large group, Google's social algorithms responded."

Maislin also believes that Google's advertising-revenue business model affects its search results in interesting ways. For example, if the best, most authoritative and trustworthy search results came up on the first page, most people would not navigate any further through Google's results and hence not view as many Google advertisements. Basically, if the first-page results are less than ideal, users would be more likely to click on the next page and view more advertisements. "When you

go to Google, what inspires you to keep clicking on the next page of results?" Maislin asks rhetorically. "Maximizing ad revenue is probably important to Google. If they put too many ads on the first page of their search results, people would leave. So what you are looking for is not perfection (in first-page search results); what you are looking for is something close to perfection" (so people will click through to the next page).

The Easy Way Out
"Anyone conducting research who only goes to Google is not really thinking critically," adds Steven Bell, who at the time of this interview was the associate university librarian for research and instructional services for the Temple University Libraries. "They are just doing the most easiest and convenient thing that comes first in their mind. I don't mind them using any Internet search engine if they also plan out a strategy that involves two or three other databases within their discipline, or through something that is a general database that would give them multiple sources of information so they could assess and evaluate what they're finding through a form of triangulation."

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Chapter 11: Critical Thinking

Bell adds that navigating through most library databases is often a cumbersome and frustrating experience. Plus, when it comes to conducting research online in our rapidly changing digital world, student behaviors are changing dramatically. Today, many students typically give up the possibility of more fruitful research results if information isn't found instantaneously through one, simple Google-like search box.

Bell explains that part of his job is to change students' opinions about the difficulties and challenges often associated with online library research tools. "Currently, when they first look at online library research tools, the first thing that comes to their minds is 'I don't need these. They are too complicated.' And we even see this in our own profession now, with librarians saying 'Well, library databases are too confusing. Students don't understand them," Bell explains. "And I agree, but sometimes you need to sit down and learn something. Physics is complicated, too, but if you want to be an engineer you are going to have to take the necessary time to learn about physics. That's all part of being a critical thinker." Bell adds that as faculty build more information literacy-oriented modules and exercises, by discipline, into their classroom instruction and homework assignments, "critical thinking will start to happen more naturally rather than being a forced behavior that we push on students."

Visual Literacy
Critical thinking also applies to the visual aspects of information literacy, especially since children are growing up with more visual stimulation from television shows and electronic learning and gaming environments than ever before. Unlike baby boomers, they are not text-centric, but instead image-centric in their consumption of information.

Susan Metros, formerly professor in the Department of Design at Ohio University, explains how "misrepresenting something visually or not understanding the power of visual images in anything you do can almost be life threatening now." For example, Metros points to the infamous set of Danish caricatures depicting the Prophet Muhammad that set off worldwide protests and condemnations resulting in tragic violence and death. Indeed, the power of images can have enormous implications.

Being visually literate today means, in part, that we have an understanding of how images -both moving and still and ultimately published online - are created and manipulated. "We tend to think, if we see it, we believe it," says Metros. "But your thirteen-year-old can manipulate images using Photoshop (sophisticated image-manipulation software made by Adobe). And news organizations and big media frequently crop images to give us different perspectives. I have a wonderful image of George Bush meeting with the troops in Germany. It was on the front page of USA Today," she adds, sardonically. "It was so obviously Photoshoped. Someone looked at the original photo and said, 'Oh, we need an African American, an Asian and a woman (added to the troops in the background).' You could see the feathering effect around the images, but there was nothing noted near the image that said it was a (fabricated) collage."

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Chapter 12: New Media and Our Participatory Culture

In addition to being information literate and visually literate, one needs to understand what's happening in the so-called worlds of new media and the participatory web. New media takes into account all of the most recent information and communications technologies that are driving news and entertainment to our computers and mobile devices. The participatory web, which is part of today's new media environment, is also referred to as "user-generated content," "we media," "social media," the "democratized web" and a variety of other names.

According to Carleton College Cinema and Media Studies Department Professor John Schott, who taught an innovative six-credit course titled "Participatory Media," the participatory web is where anyone can gather, produce and publish their knowledge about anything to the world through a wide variety of New Media, such as weblogs, photo blogs, podcasts and videoblogs. It is the ability to find, collect, archive, share and remix audio, video and images online in a new Do-It-Yourself (DIY) culture.

What are the new realities of the participatory web? There are two schools of thought. One is that the participatory web is like the Tower of Babel and only adds to an already overabundance of irrelevant, hard-to-comprehend information published online. The other is that the participatory web has become the home for new individual voices and like-minded communities of interest that are catalyzing meaningful cultural and political change, with the same, or greater, level of credibility and importance as professional mass media.

Some of the literature about these two realities have strong voices. For instance, Jaron Lanier, computer scientist and Discover Magazine columnist, referred to the participatory web, ala wikis and other forms of social networking, as a new kind of social collectivism driven by a hive mind that is dangerous, stupid, boring, and, at times, capable of lowering the overall expectations we hold for individual human intellects.

Best-selling author Steven Johnson added his take on Lanier's point of view, when he wrote that "a swarm of connected human beings is a fantastic resource for tracking down software bugs or discovering obscure gems on the web. But if you want to come up with a good idea,

or a sophisticated argument, or a work of art, you are still better off going solo."

Still, the participatory web had a banner years. Remember, for instance, The Time Magazine December 25, 2006 issue cover story devoted to the participatory web, naming "You" the Person of the Year, and calling "You" the Web 2.0 revolution, where "the stupidity of crowds as well as its wisdom" are harnessed online. The TV show 20/20 was on Time's heels with a special two-hour broadcast on December 29, titled "Caught," which featured "the craziest, funniest, most dramatic and most compelling images captured this year and shared online."

Freedom Online: Great Promise or Not?
Yale Law Professor Yochai Benkler wrote a 515-page book about the participatory web (and much more) titled "The Wealth of Networks: How Social Production Transforms Markets and Freedom." In a nutshell, Benkler asserts that we are in the midst of a new information age that has given us the freedom to actively participate in a networked information economy, i.e. the participatory web, that is not motivated by financial profit or managed by an industrial complex. "This new freedom holds great practical promise: as a dimension of individual freedom; as a platform for better democratic participation; as a medium to foster a more critical and self-reflective culture; and, in an increasingly information-dependent global economy, as a mechanism to achieve improvements in human development everywhere."

Nicholas Carr, former executive editor of the Harvard Business Review and author of a blog called "Rough Type," takes issue with Benkler's point of view. "I think Benkler is absolutely right," he says. "Social production, voluntary labor and cooperation over the Internet is a very real phenomenon. Where I take issue with him is in his belief that this free social production exists outside of the market economy, that it is independent of managerial structures and independent of what he calls the pricing system. In fact I think that we are seeing social production - rather than being separate from the market system - is very much being incorporated into the market system, because companies are realizing that they can draw on this content that is being produced for free."

Carr further elaborates, saying that Benkler's wealth of networks will ultimately become similar to how mass media has always worked. "The people who are able to produce the most valuable and most popular content are going to end up getting paid. Benkler's mistake is in trying to draw too clear a distinction between social production and market production. I think they are going to merge together into some kind of blend. His idea that there is some kind of purity in social production is not going to hold up."

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Chapter 13: The New Knowledge Culture and the Everyman

David Weinberger, co-author of The Cluetrain Manifesto, author of JOHO the Blog and "Everything is Miscellaneous," and fellow at Harvard's Berkman Center, provides another optimistic point of view regarding the participatory web. He cites Wikipedia, for instance, as proof of concept in how a shift in our knowledge culture is continuously developing rapidly since the mid 1990s when Netscape ignited the Internet boom.

"Wikipedia is proof that a resource as good as most encyclopedia, and in some cases better than most encyclopedias, can emerge from a decentralized group of people whose expertise has no external validation; it is not visible. That is a liberating idea. It can be done. Presumably we can have some hope that various forms of collaborative efforts can work in other areas, as well, for example, in scientific research and pharmaceutical research and in education and so forth."

Weinberger believes that although Wikipedia does not have good editors in the traditional sense, "it does have alert readers that seem to be doing a pretty good job in most of the areas." And although it can be difficult for the "everyman" to surf through all the online noise and understand, for instance, that Wikipedia is very often not be the best source of valid information, "we have always been very good in real life with judging credibility and nuance. Of course, we get fooled, too, but, in general, we know that if it looks like The National Inquirer, we should take it with many grains of salt."

Weinberger goes on to say that "the biggest, most controversial claim that has emerged from the web in the past five years is that, in fact, the interaction between people unknown to each other tends, in some circumstances, to produce reliable knowledge. That is the claim. I tend to think that it does and it doesn't. A lot of the most interesting developments on the Internet have been exactly around us, together, figuring out how we are going to figure out who to trust and believe."

Wade Roush, former West Coast senior editor of MIT's Technology Review Magazine, like Weinberger, is not so much concerned about today's everyman being unable to decipher the vast and varied quality of credibility that lives on the web. "I put a lot of trust in people's good sense," he says. Roush, however, might disagree with Weinberger's

views on Wikipedia. "At the Technology Review we have a very rigorous fact-checking process, and the fact checkers will not accept Wikipedia as a source for back-ground information, and for good reason. You have no idea whether a Wikipedia article is mostly true or was just hacked by someone and is now all wrong." On the other hand, Roush does admit that "you can use Wikipedia as a launching point for finding more information (on just about any given topic)."

Questions About Scholarly Authority, Books and the Library of Tomorrow

Roush also brings up a good conversation about Net Generation students in higher education and their notions concerning the definition and recognition of scholarly authority discovered online. "I would hate to be a college professor right now because I would not know how to deal with term papers that come in where the entire bibliography is comprised of URLs," he says. "I think we are in midst of a generational change in the understanding of what scholarly authority is." Roush adds that when he was in college, before the web, his senior thesis was based on books and other printed materials that he had to dig out of his university's academic library. "Now it is possible to write an entire undergraduate thesis without ever setting foot in a library," he says. "And I think you can imagine having a hard time arguing to a 22-year-old today that his or her thesis would have been more credible if they had gone to the library and found a bunch of books. They would probably say those books are old."

Indeed, Roush is right, but this kind of thinking is no longer confined to only 22-year-olds. In short, college and university libraries are striving for a better understanding of what really constitutes scholarly research in a digital age. Like all of higher education, libraries are in the process of figuring out the best ways and methods for discovering and sharing intelligent, trustworthy information that is already published, or publishable, online.

Due to the growth of mass digitization and new communications and information technologies, higher education library physical spaces are changing into socially interactive learning environments where books are not as prevalent as they have been in the past. This point was brought out, anecdotally, in a series of Association of American Universities workshops in which leaders at research institutions were asked about their plans to build more libraries. The general consensus

was that newly built libraries would not be shelving as many books in their primary physical space as they have in the past, with vast quantities of their holdings being moved into off-campus high-density, retrievable storage facilities. Then, the question became "What are you going to put in your libraries?" The common denominator was a coffee shop.

The answer is akin to the old cliché that the more things change the more they stay the same: "Because of the wealth of online materials, many scholars can do their research and writing anywhere, yet ironically we find ourselves going to the library no less frequently than we did before. We go for help with using online resources and to learn about software that supports our scholarship. . ."

Only now they can also grab a cup of coffee and connect with like-minded colleagues in a more socially interactive space.

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Chapter 14: Surfing Through the Noise Via Your Public Library Access

On another level concerning access to the growing wealth of online library materials, Gary Price, former director of information resources at Ask.com, founder of ResourceShelf weblog and a distinguished academic librarian, frequently talks about how most people are unaware of the vast amount of viable, authoritative and trustworthy online materials available through public libraries across the country.

"What gets past just about everybody I have spoken to is what public libraries have to offer," he says. "Public libraries have full text and content of hundreds of different databases and, depending on the library, it's all available for free 24/7/365. All you need is a library card. For example in the Washington, DC metro area there is reciprocity between all the major libraries at the county level. So, for example, through the Arlington County public library in Virginia I have access to the full text and images of every article published in the Wall Street Journal, the Washington Post and the New York Times."

Moreover, says Price, most libraries in the United States, either at the state or county levels, now offer 24/7 Q and A services. At some public library systems, for instance, patrons can chat online with a professional librarian who will then direct them to viable sources on the open web as well as to the databases available through their public library system.

"The solution (to effectively surf through noise) is to become a better consumer of what is out there and understanding the strengths and weaknesses of each product," Price continues. "As a consumer I want to know what each search engine has to offer and where the information is coming from. I don't think enough attention is being put towards that, especially in our educational system."

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Chapter 15: As We See More, Do We Learn More?

Mark Glaser, author and host of the PBS-sponsored MediaShift weblog, talks about how it has become more important than ever to educate ourselves and to take a closer look inside the origins and manifestations of our sources of information inside this new media, this new participatory/DIY culture, this new knowledge culture. "I think we were lazier before; we just accepted what we were fed," he says, referring to our past habits for ingesting news and information from a much lesser quantity of sources. "Now that we see more, we are starting to understand what it takes to actually put together a news story." The growth of citizen journalism, for instance, where anyone can take a photograph or video of the news, write about or broadcast what's going on as it occurs, and publish it online in a matter of minutes, has brought about a new information- and news-gathering experience that forces us to pay closer attention to our sources of information and ultimately choose the most trustworthy and authoritative among numerous options.

"But I don't think we have seen the solution yet; I still feel like we are grasping" (at finding a way to effectively surf through the noise), adds Glaser. "Editors can help solve the problem of too much information. Or, having a trusted aggregator can help. Digg (and sites like Digg), for instance, with this idea of community aggregation, looks interesting, but I'm not totally sold on that yet. I think there needs to be a killer combination of community-generated news and editors both working in collaboration together."

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Chapter 16: What's Next?

To state the obvious, there are, indeed, numerous answers and tools available to us online. Overall, the World Wide Web is impossible to track effectively. It is loaded with hard-to-find authoritative and trustworthy content, packed with both stupidity and wisdom, and something that continues to grow at an enormously fast rate through mass digitization and through the adoption of new media. So far I have only scratched the surface of the web.

Some very important elements of the Internet, the web and today's information age include mashups, mobile computing, unbiquitous computing, social networking, cyberinfrastructure, web services, virtual worlds, grid computing, social networking and bookmarking, content aggregators, podcasting, RSS feeds and Ajax and Atom, bit torrent, Library 2.0, the Long Tail, collaborative authorship, and citizen journalism. Plus, there are many other terms and topics of interest related to the information explosion spreading online that I have yet to discover or explore. Each day I am surprised by some new development or turn of events that looks to have the potential of bringing about dramatic change.

How Big is the Web?
Nobody really knows the exact size of the World Wide Web. Much of the information about the size of the web and how fast it's growing is not consistent, and it does not look very authoritative.

I have yet to find any solid evidence about the total number of websites on the Internet. There are, however, lots of interesting and divergent statistics from numerous companies that study what websites get the most hits and visitors, what keywords are put into search engines, and much more.

The question of authority asks if the people providing information online are recognized experts. In other words, can their views can be considered valid, at least from the standpoint of their station in life, i.e. are they professionals in their respective field?

Trustworthiness takes the question of authority to the next level. Someone can be a recognized expert, but that does not mean that he or she is the kind of person who takes responsibility for his or her

actions. Trustworthiness asks whether the people providing information online are credible. Do they possess the merits of believability and hence garner our trust?

A solid method, borrowed from the schools of journalism, for deciding whether any website is authoritative and trustworthy is provided below. It's called the "Five W's," meaning Who, What, Where, When, Why and a silent How.

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Chapter 17: Applying the Five Ws to the Online World

Here's how to apply the Five Ws to any website:

Who: Name the people or person in charge and provide their bios, with photos and an overview, as well as links to, downloadable files and/or web pages of past working experiences and client samples. (Some would disagree about the photos, saying that people make rash judgments based on mug shots.) Make it easy for your visitor to know who you are and be able to contact you or a representative of your business. There's an oversupply of websites that don't clearly tell you who runs the business, or these sites have a anonymous "contact-us" form that does not clearly identify who the form is actually being delivered to. This is one of the biggest credibility failures of many websites. If you can't tell people who you are, your readers might think you are hiding from something. There's more to the "who" function of any website. Explaining who you are should also include your version, or someone else's version, of what gives you the authority to present information that is credible and trustworthy.

What: Any website should describe the nature of its owner's business in easy-to-understand terms. The other part of "what" concerns quality of content and design. Is the content well written? Is the website graphically consistent and easy to navigate through? The Internet industry term for this is "usability." In September 2005, the man known as "the king of usability" by Internet Magazine and "the guru of web page usability" by the New York Times, Jakob Nielsen, explained the irony of the web, noting succinctly that, while the primary purpose of the web is to provide information, it is also loaded with "bad content and [a] lack of information people need - either because it is not provided at all or because it is written in a poor, impenetrable style."2 All you need is one search engine response to a query to realize that this still holds true today.

Where: Something is definitely amiss if there are not working e-mail addresses, a real physical address of where the business is located, and working telephone numbers listed in a easy-to-find spot on a website. Are you located in Silicon Valley, Silicon Alley (the Manhattan version) or Bath, England? Are directions to your place of business provided? Are you hiding?

When: Today, when it comes to information about the Internet, World Wide Web, and communications and information technology, in general, timeliness is vital, as everything changes so quickly. At the same time, we web surfers often fall into the trap of depending too much on the very latest information out there, when, in fact, there's plenty of valid and important, but older, information available online about any given topic, dating back as far as the web will take you. The important thing is that anything posted on a website should have some kind of time-stamp on it, so the reader understands the currency of the information being displayed and can then discern its applicability or non applicability to the task at hand.

Why: What are the motives behind the website owner's content? Is it clearly spelled out that the purpose of the content is to sell you something? Is the cost clearly noted, or is that information buried someplace at the end of a shopping-cart function? Is the content geared toward only providing information to its visitors in the spirit of sharing, or is there some other, not-so-evident, ulterior motive.

How: How was the information presented on the website discovered or created, and is it consistent with other information from other reliable sources? For example, sometime back I could not find any other authority other than CNN that claimed that there were 100 million websites. CNN, however, found it worthwhile to mention this figure like it was an absolute truth, as did hundreds of blogs. One would think that generic, statistical information, such as the total number of websites on the Internet, would have some corroborative numbers elsewhere on the web, but, in this case, I could not find anything.

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Chapter 18: Finding the Hard to Find

There are numerous websites that fail to meet some of the 5 Ws but are still credible and packed with trustworthy research-based information. Many are in the academic realm, created by educators who typically post their curriculum vitas, along with links to their scholarly writings, on very unattractive and poorly designed web pages that do not have decent metadata.

Metadata, for those who are not familiar with this word, is really not as technical as it sounds. Simply put, it is the identifying words and tags that are put inside a website's background code. Metadata is utilized by search engines to index and ultimately reveal search results when users conduct queries online. Metadata is not discernible on the web pages we see on our web browsers unless we go to the source view.

At a Chronicle of Higher Education technology conference, Adam Smith, group business product manager for Google Book Search and Google Scholar had this to say about metadata: "We love metadata; we'll take all you can give us, but it is a mess. When you really dig into it a little bit, parsing it and making sense of it for the older material is a disaster. But we are doing our best."

So, without going into extraordinarily technical details, the basic message is that there's plenty of intelligent life on the web that is not so easy to discover through the major search engines (e.g., Google, Yahoo, Bing and Ask.com for examples) because of the lack of good metadata.

Accessing the Smart Web Through Proprietary Databases
Another enormous block of authoritative and trustworthy information available online resides within the full text of scholarly journals and various other publications that are accessible only through a paid subscription.

There are two ways to obtain access to the full text of such paid-subscription information: purchase it yourself or become a member or employee of an institution or company that provides access to such information through its library system. Academic libraries, for instance, subscribe to proprietary databases and provide access to numerous paid-subscription publications to its students, faculty and staff. These

patrons are authenticated users assigned with usernames and passwords that allow them into the institution's virtual libraries.

So, if you don't have lots of discretionary funds to purchase paid subscriptions, or you are not an authenticated user of some proprietary library system, the accessibility to some of the most authoritative and trustworthy information online is not at your fingertips.

The Drive to Bring More to Your Fingertips
Google has developed an online service that allows users to more easily gain access to such authoritative and trustworthy content. Google Scholar, for instance, has a Library Links program where partnering academic libraries are able to make their licensed resources available, through link-resolver technology, to those authenticated patrons who prefer to conduct their research through the Google Scholar interface as opposed to going directly to their institutional virtual library system interface.

Overall, if you depend only on search results from Google, Yahoo, Bing, Ask, or pretty much any of the search engines out there to answer your queries, you are not getting the most intelligent results. Most search engines simply give you extremely long lists of results that, for the most part, are a source of confusion and not very focused on showing you the most authoritative and trustworthy online information available today at the top of its search results.

Search Engine Boom
There are many search engine companies in early stages of development that are striving to be alternatives to the big four – Google, Yahoo, Bing and Ask. Many of these newcomers' "main business proposition is to be bought by Google, or for that matter by Yahoo or Microsoft," wrote Miguel Helft in the New York Times.

Mass Digitization
Amazon and Google are also in the mass digitization/eBooks business.. Others, who came into this field well before Google, include the Open Content Alliance, Project Gutenburg, the Million Books project, the University of Virginia Electronic Text Center, and the Internet Archive (not an exhaustive list).

Some of today's Web pundits say that we have entered a new era in which it is possible to digitize all of the world's books into a universal, online accessible library. "Might the long-heralded great library of all knowledge really be within our grasp?" asks Kevin Kelly from Wired Magazine in a New York Times Magazine article. His answer is yes, and he provides his proof of concept, in part, by explaining how the digitization process is being accomplished today: "Stanford University is scanning its eight-million-book collection using a state of the art robot from the Swiss Company 4DigitalBooks. This machine, the size of a small SUV, automatically turns the pages of each book as it scans it, at the rate of 1,000 pages per hour. A human operator places a book in a flat carriage, and then pneumatic robot fingers flip the pages - delicately enough to handle rare volumes - under the scanning eyes of digital cameras."

There's controversy surrounding the mass digitization world, with questions about copyright infringement and who gets control of any such universal library. The Associated Press reported that there's a philosophical debate concerning Google, a commercial entity that is scanning 3,000 books per day, and possibly controlling mankind's accumulative knowledge. The article quoted Brewster Kahle, founder of the Internet Archive, as saying that "they [Google] don't want the books to appear in anyone else's search engine but their own, which is a little peculiar for a company that says its mission is to make information universally accessible."

Recap
I have painted this small picture of the web as being hard to measure in size, loaded with hard-to-find authoritative and trustworthy content, packed with both stupidity and wisdom, and something that continues to grow at an enormously fast rate through mass digitization and through the adoption of new media. I've also talked briefly about search engines and have provided a methodology, that is not rocket science, for discerning what is valid information online. All of this is only scratching the surface of the web.

On Noise
A negative side effect of this researching, interviewing, learning and reporting experience has been that I am frequently overwhelmed, as I would imagine anyone trying to harness and better understand the web would find themselves. As I continue to surf through the web, I

find myself, at times, holding up my head with my hands covering my ears, like I'm attempting to cover up some "noise." As I noted early on in this report, the web, with all its new implications that change with the click of a mouse overnight, has become a morass of incomprehensible noise, a cacophony of websites and web services. My goal now is to somehow make it quieter, with a tonal quality that I can control and listen to in comfort, similar to turning the volume down a few notches on the stereo or radio, or, better yet, the MP3 player.

Learning how to find and analyze the desired information online - the kind of information that can help solve problems and challenges, answer our deepest questions, and perhaps bring about some positive change in our culture and politics - is what every web-savvy citizen needs to pursue more ardently than ever before. The web can provide us with what we need to know, and, from an historical perspective, what we have never been privy to see before. The ocean we call the web continues to expand ferociously into something we cannot accurately predict. But two elements of the web are certain: there's a strong cross current of garbage and misinformation, and a strong cross current of wonderful gifts of knowledge and accurate, useful information at our fingertips.

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Chapter 19: The "Long Tail"

All of the aforementioned catalysts of 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, tablets and hand-held devices, 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.

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 literacy 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 2004 and afterwards in a book that shot up into the bestseller lists quickly. The Long Tail was written by Chris Anderson, founder of the famous TED, which, as noted on its website is "a nonprofit devoted to Ideas Worth Spreading. It started out in 1984 as a conference bringing together people from three worlds: Technology, Entertainment, Design. Since then its scope has become ever broader. Along with two annual conferences – the TED Conference and TEDGlobal – TED includes the award-winning TED Talks video site, the Open Translation Project and TED Conversations, the inspiring TED Fellows and TEDx programs, and the annual TED Prize."

"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," wrote Anderson

"Put in another way, these days our watercoolers are increasingly virtual–-there are may 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."

What does this have to do with education and information literacy? 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 blogoshpere 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 librarian Katherine Mossman noted in "Serving the Niche," "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.'"

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."

To put it simply, while more information choice is good, presenting it in a way that organizes it, instead of confusing it, is better, notes Anderson. 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.

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Chapter 20: 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.

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 bring 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, andrecognizing 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 world 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 American Library Association (ALA) conference, 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."

The professional expectations of librarians have shifted, explains librarian Scott Walter. 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 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.

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Chapter 21: Embedding Information Literacy
Across the Curriculum

In a blog post hosted by the Association of College and Research Libraries (ACRL) that was written by Walter, 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, interaction, 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."

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 are must have skills for living an intelligent life in the 21st century.

At the risk of sounding corny: "Surf's Up, Dude." Let's ride the online knowledge wave, stay balanced, learn how to avoid nasty undertows, know where we are at all times, and reach the shoreline safey so we can hop in the next wave of information.

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