Abstract: The purpose of this white paper is to encourage faculty, administrators, and librarians to ensure students graduate with the fourth “R” – research skills (aka information literacy skills). Research skills are just as important as knowing how to read, write, and do math. Today, information comes in a wide variety of formats and ranges in quality. It is our role, as educator’s, to teach the next generation how to search for, locate, and analyze information effectively, regardless of format or technology used. Imparting this knowledge gives students the skills required to succeed at work, to create new knowledge, and to give back in a positive way to society, no matter where they are located in the world.

Introduction

The content of this white paper has been a long time in the making. Teaching others how to search for information is not a new concept. In the late 1800’s, Justin Winsor, librarian at Harvard University and Boston Public Library said, “a great library should be a workshop as well as a repository. It should teach the methods of thorough research, and cultivate in readers the habit of seeking the original sources of learning”. [1] Since that time, information literacy instruction has progressed slowly to the point where a paradigm shift not only in attitudes and perceptions toward the importance of such education, but also where instruction should occur throughout curricula needs to happen. On most campuses worldwide, instruction of this type includes only a portion of the student body in part due to librarians and faculty self-selecting when, where, and how to address this issue. Knowing how to locate the information you want and need is integral to one’s success or failure in anything attempted – whether it be finding a cure for cancer or constructing a building in an earthquake zone using the latest technology. Unfortunately, we are doing a very poor job of imparting information discovery skills to others.

That is not to say that we need to start from scratch. Information literacy programs that use best practices have the foundation from which to significantly move instruction forward so that it meets the needs of all students that enroll in university. For too long, librarians have worked diligently to raise the importance of instruction across all disciplines. These efforts have fallen on deaf ears. Unfortunately, the message is still not getting through. The purpose of this position paper is to lure faculty and administrators on the quest to fully prepare students to not only search for, locate, and analyze information effectively, but to also be able to recognize “…the importance of [the] social context to the production, evaluation, and communication of good information…”. [2] Information literate individuals are able “…to relate their skills to whatever context they find themselves in.” [3] As such, we need to
ensure that we are sending information literate individuals out into the world upon graduation from our institutions.

The Importance of the Fourth “R”

Reasons for doing a more effective job of teaching others to be information literate are compelling. It can be argued that the top two most important reasons for an information literate society are: living in one of the best democratic, open societies in the world and improving our global competitiveness in an increasingly challenging economic world. As Massis states, “…the economic impact of not doing so is painfully obvious.” [4] Altruistically, the ultimate reason is to make our world a better place in which to live.

Clark says this more directly:

“Business needs people with imagination and vision. And government needs people who can analyse problems and dream up solutions. And the future needs people who are prepared to challenge the old assumptions and ideas and who can inspire and harness the intelligence and passions of those around them…” [5]

As we know, information is everywhere and never stops coming. According to Gantz (2008), “the amount of information created, captured, or replicated exceeded available storage for the first time in 2007...by 2011, almost half of the digital universe will not have a permanent home.” [6] (If you are really interested in the explosion of information, take a look at the World Wide Information Growth Ticker (http://thecontentwrangler.com/2011/03/02/worldwide-information-growth-ticker/). It will give you (in real time) the growth of information on our planet every second.) [7] Compare this to the pre-Internet era when most instruction included textbooks and supplemental readings – essentially a limited amount of information. Today information exists in a variety of formats, using a plethora of technologies. In addition to the traditional print book and article, you can find information via Googling, social networks such as Facebook, e-books, smart phones, laptops, Twitter, blogs, television, radio, electronic bulletin boards, family, friends, and colleagues. Information needs to be assessed for quality, accuracy, relevancy, timeliness, usefulness, and authority – no matter the technology used to convey the information. What a radically stark contrast to the pre-Internet days when searching for information involved looking through card catalogs and browsing stacks of books. You had to wait to obtain the information – so different from today’s expectation of immediate gratification. And, if it doesn’t occur, the tendency is then to change your topic of research (if you are a student) given the information that is immediately available.
Information access was also relatively free. Still, to this day, checking out materials from a library does not involve a direct payout by the user. Photocopying is usually under 25 cents per page. And, interlibrary loans charges rarely exist. Today, much information (albeit of varying quality) is available free via the web. The “good” information – the information needed to conduct research, achieve promotion and tenure, including obtaining the full, complete text of an article costs money. Many sites now offer pay-per-view for being able to access the complete content of an article or a “live” event. Here cost is directly borne by the user. Library sites provide access to this quality content by paying exorbitant subscriptions which continue to rise dramatically, much in the fashion of health care costs today.

“An education isn’t how much you have committed to memory, or even how much you know. It’s being able to differentiate between what you do know and what you don’t. It’s knowing where to go to find out what you need to know; and it’s knowing how to use the information you get.” – William A. Feather (1889-1981) [8]

We live in a world of information glut. We live in a world where the information itself has become a commodity resulting in a decrease in access to information for all. Libraries with limited budgets can no longer obtain access to information that faculty and students rely on to obtain promotion and tenure, to learn, and to create new knowledge as percent annual increases in electronic information subscriptions for 2012 are anticipated to be between 7% and 9%. [9] We continue to perpetuate a society of haves and have-nots. A recent example is the pay-per-view approach of The New York Times. [10] Those who can afford not only access to information, but also the technologies to obtain access are at a significant advantage over those who do not have the financial means to find and use the same information.

Some information continues to remain free. Government information (information that governments determined can be shared), information published by individuals, and research made available through an open source format are easily accessible. There is also the category of information of questionable value (questionable when compared to information based on scholarship and research) that includes political pundit shows, talk radio, incomplete information transmitted via Twitter – basically information “noise.” It is our responsibility to educate the next generation, and possibly several generations thereafter, to be able to find “sound” information including the skills to be able to filter out information of a suspect nature.

The Problem Is Serious

The overall curriculum design for information literacy instruction has not risen to the level of its importance, regardless of the discipline to which it is attached. In fact, planning has been very poor indeed. In the United States, instructional design of most information literacy programs follows sound standards set forth by the American Library Association. [11] It is the implementation of instruction that requires significant attention.
Information literacy implementation takes a “haircut” approach. Some instruction is pre-planned, being scheduled semester-after-semester, like a standing haircut appointment. Others think of instruction a few weeks in advance and schedule accordingly. Then there are those that come to the realization that their class needs instruction tomorrow; and/or know that they will be out of town and schedule the class for that day; and/or would rather take the teach-it-myself approach. Like cutting your own hair with a Flowbee® or using a bowl on your head as a guide, the results for skill instruction and retention are the same – like locks on the floor only to be swept away.

The results of this approach are astonishingly poor. Yes, student evaluations of instruction provide librarians with a morale booster – “Thanks for showing us the library. Now I know who to ask when I have a question.” Pre- and post-testing provides data on what level of basic search skills students possess (i.e., Is this citation correct? Would you use “AND,” “OR,” or “NOT” for this search?) Granted, there are courses where information literacy instruction makes a positive impact, as is evidenced by relevant sources used in a paper or project. Unfortunately, this is not the norm in higher education in the U.S. today. Selective, inconsistent scheduling of instruction is a haphazard attempt to try and infuse information literacy across the curriculum. The result excludes students, and not by their own choosing. For example, if you offer five sections of a sociology course, three of the instructors may include a “library session” and the other two may not – either for lack of knowing about this possibility or of not wanting to include information literacy instruction into their course section. This problem is further exacerbated when many sections of a course are taught mostly by adjunct faculty, who frequently change from year-to-year, and semester-to-semester. If information literacy goals and objectives are not explicitly stated in the course goals and objectives, some students might receive instruction and some might not.

Additionally, not planning leads to repetition of the same lower level information literacy skills; little or no time for teaching higher order search, analysis, and critical thinking skills; repeatedly using the same old assignments; and complaining about how students do not know how to do research when faculty grade research papers and projects – appalled at the lack of scholarly information cited in bibliographies.

A 50-minute “one-shot” session is inadequate time to: provide an orientation to the library building and services offered (e.g., 24/7 access, borrowing laptops, interlibrary loan, etc.); imparting information on all the print and electronic resources are available; teaching search strategies such as Boolean operators (and, or, not), limiting (by year, by format type, by language, etc.), distinguishing scholarship from other forms of information, and how to download and upload information into such citation tools as EndNote®.

Lack of instructional design of effective assessment measures (e.g., research papers, projects, presentations, etc.) of information literacy skills does not do anyone any good. To this day, students come to the library seeking advice on how to “find The New York Times headline for my birth date using something called ‘microfilm’ “, or “go to the reference section and find the book about X and tell me the answer to Y” – only for the student (and librarian) to discover that the answer to the question has been marked numerous times by former students. My response to this is: When is the last time you used a
library? Are you aware that this generation has not known the world without the Internet? Do you really think that students will learn how to search for, locate, and analyze information by going on these scavenger hunts?

As a faculty member who seeks to read quality research papers and projects and to listen to well-researched presentations, a re-conceptualization of the assignments given needs to occur. Having students go through a 50-minute “one-shot” session and telling them to write a 25-page paper using scholarly resources without effective information literacy instruction will result in what you have been reading for many years – bibliographies with *Time*, *Newslink*, and dare I say *Wikipedia* instead of the journals in your field of study.

Wrong Assumptions & Dispelling Myths

So why does this substandard approach to information literacy instruction continue? And why does such strong resistance to either change the status quo, or eliminate this type of instruction altogether persist? The answers can be found through faulty assumptions:

1. **All information you will ever need to do anything is on the Internet.** Please, do not continue to spread the myth that “everything is on the Internet” and “all books will be digital soon.” Depending upon your discipline, much information is still available in print (as well as electronic) and is sometimes, still, is only available in print. In 1978, F.W. Lancaster predicted a paperless society. That was over 30 years ago and this still has not transpired. [12]

2. **Students do not read books.** Have you talked to your students lately? Have you observed them browsing the book stacks in libraries and bookstores, carrying books around in their backpacks, and actually reading them? Observe your students in these venues some time. You will find that, yes, they do indeed read books (in addition to finding information in electronic and other non-print/media formats). They also use them both in the library as well as borrow them! Last year, in one of our campus libraries alone, we picked-up approximately 25,000 books – clear evidence that our users (the majority of which are students) – do use print books.

3. **Students just want a large space in which to study.** Yes, they want quiet study space – in the library amongst book stacks. I had a professor recently share that he was quite surprised to learn that students enjoy being around books and in libraries. “My students use the library to locate information, work on projects (individually and in groups), and to study. Students view the library as the destination on campus where you go to do serious study and research.”

4. **There is no time in my courses to teach information literacy.** Unless students are going to learn how to find information effectively, especially the information in a specific discipline, by osmosis, then time must be made. Faculty and librarians who collaborate on a.) curriculum mapping of information literacy skills, b.) developing assessment instruments (e.g., evidenced-based projects, real life problems to be solved, etc.), and c.) using various delivery methods (e.g., in-library, in-class, online tutorials (both generic as well as incorporating a specific project)), journaling the search process, and so on find that this strategy is less time-consuming over the long-term and, most importantly, yields vastly improved student projects and papers.
Instead of complaining about poor bibliographies, one can rave about the information found and used by students as well as the instructor being exposed to additional scholarly literature.

5. **Students already possess these skills.** Most campuses have solid freshman-level, first-year-student information literacy instruction programs that teach students the very basics of searching for, locating, and evaluating information. New students arrive on campus with varying levels of search skills, depending upon where they went to secondary school. Did the school have a school media center (library) that was usable (with current technologies and information)? Was a certified school media specialist on staff to collaborate with teachers on instruction and support students academically? Did students receive instruction on how to search for and analyze information as well as to cite information appropriately? Was a specific program, such as Mike Eisenberg's and Bob Berkowitz' **Big6™ Skills**, [13] implemented throughout the school at all levels? Librarians develop and teach basic skills in the first-year of college or university to attempt to level the playing field. It is the higher order searching and analysis skills that require systematic placement in course curricula to make the impact we are seeking.

The days of learning how to find information via the “sink or swim” or exclusionary method are over. Collectively, as well-educated individuals, we certainly can do better – and must do better – than this.

**Paradigm Shift: Making the Change**

If we accept the following premises that:

- most information literacy programs on campuses across the U.S. follow instructional standards, such as the **Association of College and Research Libraries’ Information Literacy Competency Standards for Higher Education**; [14]
- scheduling of information literacy sessions is faculty-driven (and librarian persuaded);
- assignments used to assess the level of learning and retention of information literacy skills need constant revision;
- and such instruction is not, in most instances, mapped to curricula

then working toward having students learn and retain the fourth “R” is a matter of logically mapping instructional goals and objectives to curricula that also includes levels of skill mastery.

According to the Association for Supervision and Curriculum Development, curriculum mapping “is a process for recording what content and skills are actually taught” over a period of time. [15] Based on the work of Heidi Hayes Jacobs, curriculum mapping “…removes unnecessary curricular repetitions…emphasizes cross-disciplinary connections, and encourages “spiraling” of essential skills, which involves reinforcing and extending those skills with increasing complexity…” [16]

Various paths can be taken to curriculum map information literacy goals and objectives. One way is described below:

1. Laying the framework for change
• Since information literacy generally arises out of library-related work, librarians and library administrators review of the history of information literacy on campus, reviewing instruction currently occurring, and identifying desired changes to the program to provide the library team with a common understanding. This work is important in two ways: 1.) Reviewing current practice uncovers where, across the curriculum, instruction is occurring, where it is missing (and needed), what instructional methodologies and assessment instruments are being used, and a critical eye to what is working, and what is not working; and 2.) using this conversation as the basis for discussion with other stakeholders so that all involved have a common framework of understanding.

2. Inspiring Change

• Effective conversations amongst stakeholders (library administrators, librarians, faculty, and academic administrators) regarding the importance of graduating information literate students, sharing an understanding of the history of information literacy on campus, a review of instruction currently occurring, and the outcome of initial conversations – that is for librarians and faculty to collaborate in the curriculum mapping of information literacy skills into academic programs – will be numerous involving various individuals. Here are some examples:
  
  i. Library administrators meet with each academic dean to review current information literacy skill instruction occurring in each of their respective schools/colleges/departments and agree to have faculty and librarians collaborate on curriculum mapping, which may involve working with respective curriculum committees.

  ii. Librarians conversing with faculty in departments where information literacy is happening as well as where it is not occurring. Sharing information about ACRL Information Literacy Standards [17] as well as subject-specific standards, such as the ALA/ACRL/STS Task Force on Information Literacy for Science and Technology Information Literacy Standards for Science and Engineering/Technology. [18]

  iii. Presentations in front of faculty senate, student government, and other related academic bodies, such as undergraduate education and graduate education committees, deans’ councils, etc. to explain the critical importance of creating and implementing a cohesive information literacy instruction program.

  iv. Hosting a seminar on current trends in information literacy with outside experts, and faculty and librarian panel presentations.

  v. Branding the information literacy program by creating an information literacy portal which explains the importance of information literacy for today’s students, instructional methodologies, mastery levels, how the program meets the university’s overall education goals, as well as a mission and vision statement.

3. Creating Change
As positive energy builds around the concept of re-conceptualizing information literacy instruction across curricula, groups of faculty and librarians per department, program, etc. can begin mapping information literacy goals and objectives, develop mastery levels, instructional methods, and assessment actions for each academic program. On-campus resources, such as departments of education and/or centers of teaching excellence can assist in this process by teaching groups how to effectively do curriculum mapping. A search of the education literature along with association and other education-related websites will yield of plethora of curriculum mapping best practices.

Teaching in the “New Normal”

Planning and implementing this new approach to information literacy programming will result in teaching students in all disciplines within a “new normal.” Spotty instruction and lack of skill retention will be replaced with constancy in curriculum alignment and the anticipated result of an increase in not only skill retention, but learning and retention of higher order searching and critical thinking skills. Antiquated library scavenger hunt-type assignments will be replaced with reality-based projects that will enrich the teaching and learning process. Librarians and faculty have the freedom to select from a wide variety of teaching modalities including (but not limited to) web-based instruction, online tutorials, in-library and/or in-class instruction, asynchronous and synchronous situations, and individual and group research consultations. Course requirements to assess learning are only as endless as one’s imagination. Problem-solving real life case studies, researching an issue from various perspectives (e.g., social, political, medical, legal, etc.), evidenced-based learning (commonly used in scientific and medical fields of study), and developing solutions to a societal problem are some examples. Assessment methods are just as endless – from journaling the research process online to developing a clinical information packet for an animal owner, from group presentations using multimedia to the traditional research paper – the more authentic the project experience, the more likely participants are not only to remember what they learned, but will then be able to apply the same search strategies in various situations.

Conclusion

The fourth “R” (research skills) is equally as important as reading, writing, and arithmetic, especially as we live in an information-driven world. Think how much farther along we would be if our generation and the next (and the next, etc.) would be in solving diseases, addressing destructive societal issues, and creating new ways of thinking and living if individuals acquired and retained higher level information discovery skills. Think of the traumatic situations where a patient died or major business plan was faulty due to not finding relevant information. (For example, see the 2001 asthma clinical trial at Johns Hopkins University that resulted in the death of a volunteer enrolled in the study. "Johns Hopkins’ Tragedy: Could Librarians Have Prevented a Death?"
[19]) Although such situations might not completely be avoided by not possessing the relevant skill set, there is a strong possibility that such situations, if not avoided, could be greatly reduced.

Will we need to teach information literacy skills in perpetuity? As generations move through the education system, there may come a time when another paradigm shift occurs, thereby altering the
approach used today. History shows us that information technology will continue to change and morph into other technologies. Information can be found on paper, microfilm, microfiche, microcard; recorded on VHS, Beta, reel-to-reel, cassette tapes, 8mm and 16mm film, slides, 8-track tapes, LPs, CDs, DVDs, MP3s, BlueRay, jpegs, PDFs, iPods; saved on 5 and ¼ inch and 3.5 inch disks, thumb drives, hard drives, laptops, iPads, smart phones, and “in the cloud”, accessible over digital cable, radio, by subscription, pay-per-view/on-demand, wirelessly, etc. Information, itself, continues to vary in quality, reliability, timeliness, and accuracy. Information access continues to be divided by those with resources and those without. Should these realities continue, then, yes, teaching others how to effectively search for, locate, and analyze information will need to continue.

Today’s students are not fully engaged in the educational process, missing out on many opportunities to explore, discover, learn, and understand at a deeper level. [20] Citing the results of the 2009 Lessons Learned: How College Students Seek Information in the Digital Age [21] report conducted at the University of Washington’s Information School, Weiner suggests that students find just enough information to satisfy a course requirement, and concludes that “The consequences for these behaviors are serious when considering the lifelong learning skills students need when they enter the workforce. The implications for these young people later in life when they need information to make personal life-affecting decisions can be grave.” [22]

A shared understanding that a critical need exists to significantly improve how we teach information literacy skills is needed. The paradigm shift required to effectively address the fourth “R” issue is low-cost with high-impact. Librarian expertise in information literacy instruction, and faculty expertise in content knowledge (key elements of the solution) are readily available on campus. Gaining an understanding of the process of curriculum mapping and time to implement change is all that is needed to shift into the “new normal”. Create irreversible momentum! Once that happens, no one will want to go back to – or even remember – the way instruction used to be.
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