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Generic Versus Content Dependent Skills

Abstract: The study claims that timeliness, authority, bias, verifiability, and logical consistency are criteria to be used in the construction of academic products and that practices in regard to the four criteria vary sufficiently among disciplines so that at least some reference to disciplinary content is necessary in teaching information literacy.

Résumé : Avec cette étude, je me propose de démontrer que les critères utilisés dans la production de travaux de recherche universitaires sont les suivants : le moment opportun, l'autorité, le biais, la vérifiabilité et la cohérence logique. Je tâcherai de montrer que ces critères varient selon la discipline, de sorte qu'il est nécessaire de mentionner le contexte de la discipline au moment d'enseigner la culture informationnelle.

1. Introduction

Two issues are of central importance to the teaching of information literacy courses at universities. The first is whether there exist generic information skills that can be taught without teaching content. The second is a set of intimately interrelated problems, namely what types of courses are best suited for teaching information literacy, what forms of collaboration between librarians and classroom faculty should exist, and at what stage in the educational experience should information literacy be taught. The premise of this paper is that the issue of generic versus content/discipline dependant skills and the second set of "organizational structuring" issues are themselves related. The types of courses, the stage in students' educational experience and forms of collaboration depend, at least in part, on whether librarians can be expected to teach, and students expected to learn, generic information literacy skills versus skills which can only be taught in reference to the practices of specific disciplines. Ann Grafstein (2002, 2007) offers an admirable account of the necessary embeddedness of knowledge within disciplines. Grafstein acknowledges the contextual nature of knowledge, that it exists only within interpretative frameworks and that students learn best when they can associate ideas with other ideas. She makes the distinction between information and knowledge. She believes that while information is changing rapidly knowledge, or at least the core knowledge of disciplines, is not. She also hopes that the dichotomy information/knowledge is not drawn too firmly. She notes that disciplines have different epistemologies, ways of organizing knowledge, and rules of evidence. Most importantly Grafstein argues that the goal of information literacy instruction is to assist students in integrating information into a critical understanding of the knowledge base of a discipline. Nonetheless, she argues that a clear division of labor between discipline based faculty and the teaching librarian can occur. Her argument rests on the assertion that generic information skills exist and, secondly, that such skills can be taught in a successful manner without the librarian teaching any content of an academic discipline. These skills are both "searching skills" and "critical thinking skills." The critical thinking skills involve the ability to evaluate information in terms of its timeliness, authority, bias, verifiability, and logical consistency. Discipline based classroom faculty, on the other hand, should concentrate on teaching students how to evaluate the content of the

argument, assess the validity of the evidence, and propose original solutions. Nonetheless Grafstein argues strongly for situating information literacy within the "the structures and modes of thought of a particular discipline." (2002, 202) Given possible conflict between librarians and discipline based classroom faculty, and the need to justify a place for the librarian in the classroom (or a role other than the simpliest form of bibliographic/database instruction) Grafstein's argument functions as a strong ideological legitimation for the role, and importance of, teaching librarians.

Owusu-Ansah (2004) outlines both an interim and an ultimate solution to the problem of structuring information literacy courses. Given the difficulty in mandating, at this time, stand-alone credit-bearing library courses he argues that, as an interim solution, such courses might be embedded within required courses such as English composition. At this stage libraries could combine such courses with supply-on-demand courses and with higher level elective library information literacy courses. The embedded courses would teach basic skills and the supply-on-demand courses would provide some higher level instruction. Ultimately Owusu-Ansah envisions only required stand-alone credit-bearing library courses at the beginning of the undergraduate experience followed by supply-on-demand courses as needed. In his view supply-on-demand courses would allow for discipline based classroom faculty and instruction librarians to engage in give-and-take and on-the job learning.

The question this paper will address is whether both authors underemphasize the intimate connections between discipline-based knowledge and information and the skills required to acquire, evaluate, and integrate knowledge claims and to create original work. The paper will have two components, theoretical and experiential. The theoretical portion will address the issue of the connections between knowledge and information and will draw on constructionist notions of knowledge such as those of Touminen et al (2005) and of Frohmann (2004) to problematize the claim that any important generic information evaluative skills exist. The experiential portion will draw on discipline based faculty responses to a semi-structured questionnaire on their own research activities and their understandings, as discipline based researchers, of the concepts of timeliness, authority, bias, verifiability, and logical consistency.

2. Context, Constructionism and Practice

Bern Frohmann (2004) has made a strong argument for focusing on the practices of researchers in their construction of journal articles instead of on journal articles as sources of information understood mentalistically. His work primarily deals with scientific writing and the question remains as to whether his arguments can be generalized to a range of scholarly/academic practices. He builds upon decades of research in science studies (largely sociology of science) which have problematized the journal article as a source of information. In the social science literature the scientific journal article is treated as both a product and a resource in the construction of status and knowledge claims. The "meaning" of articles is understood only within the context of a set of productive activities. If we take Frohmann's strong claims seriously two insights arise for those interested in teaching "information literacy." First, if one is teaching about information in an academic context, information must be seen as produced or constructed by means of specific research activities and the question arises as to whether research activities (which include the production of knowledge claims) are sufficiently different in each disciplinary context to make a difference in the teaching of information literacy. In other words do the practices of "expert researchers and knowledge producers" or "expert

practitioners" in looking for, identifying , incorporating, and citing timely, authoritative, unbiased, verifiable, and logically consistent sources differ across disciplines? Do disciplinary practices indicate that all four criteria are valued and employed? Is there sufficient consistency in practice across disciplines to say that these "critical thinking skills" are generic? If there is not sufficient consistency then how is the teaching of information literacy to take this into consideration?

The focus on practice raises another issue: Is this list of skills best thought of as "thinking skills" or rather as practical skills to be somehow learned in the construction of a product? How would a librarian who is not an expert/producer, or at least knowledgeable about disciplinary judgment processes, be able to convey distinctions in practice if she is only teaching a set of generic skills?

One can read Tuominen, et al. (2005) in part as a direct application of Frohmann's position on information to information literacy. They stake out the strong claim that "…information skills cannot be taught independently of the knowledge domains, organizations, and practical tasks in which the skills are used." (329) In their account communities of practice and epistemic communities are central. The argue that face-to-face interactions, important even in scholarship, should be valued in information literacy teaching because it only in such interactions that implicit knowledge present in all productive activities can be conveyed. The present study also agrees with Tuominen and Savolainen's (1996) earlier constructionist position that "information is not an entity with fixed boundaries or…a commodity that is transferred through communication channels. Rather, information is a communicative construct which is produced in a social context." (89)

3. Methods

A survey was electronically mailed to selected faculty at a private university in the eastern United States. It asked faculty to state their views of timeliness, authority, bias, verifiability, and logical consistency. Faculty were also asked to state when they had received their doctorates in order to differentiate those who were trained in academic research in the "digital age" of the last ten years from those who had received research training in the earlier non-digital environment. There were eleven respondents: three in social sciences, two scientists, two philosophers, two historians and two faculty members in literary studies. In each category there was one recent and one distant recipient of the doctorate, except for the social sciences where there were two recent and one distant recipient.

This study bears a familial relationship to research into information seeking. Ellis (1993) has stated, in study similar to this one, that semi-structured interviews using a grounded theory approach is the best means of making sense of practitioners' narratives of their own activities. In this case there was resistance on the part of faculty to interviews and so a very broadly phrased survey was used, one that attempted to approximate a semi-structured interview as much as possible.

4. Analysis of Surveys

Timeliness

In regard to timeliness, Junior Historian, as he did throughout the survey made reference to source materials. This individual works in a subfield where foreign language

skills are essential and where there are relatively few scholars in the United States possessing such skills. He answered, "The…timeliness of an article is dependent on the sources that it uses (both primary and secondary). As a rule, I do not include non-timely material in my scholarly work, although I will browse the secondary literature outside of my main field in order to obtain a better sense of broader scholarly debates that can potentially influence my own work." Senior Historian wrote, "As a historian, timeliness is not critical. I like to read recently published material to see what the developments are in a particular field, but I use a range of materials, some published more recently but not all." Junior Historian claims to value timeliness, defined as relevant source materials, and Senior Historian seems not to care. However, this is only a surface disagreement. Both indicate that what constitutes timely material is in part dependent on the context of on-going research in the field. It is not dependent on the "time" at which an article or source was produced. Junior and Senior Scientist made similar points. Junior Scientist wrote, "Timeliness may be defined simply as something published recently (for me, this means in the last ten years or so). Often when I am doing research I rely most heavily on the newest articles on a topic, usually in the last year or two, because it is most likely that those articles will have the most comprehensive list of references to other existing relevant scholarly works. This is not always true; however, no one article can cite all relevant sources. I often include references to 'non-timely' material, meaning sources that are as much as fifty years old, if they set some new standard in the field by contributing an unusual advancement of knowledge. These sources can be recognized because they were the first to contribute data or an idea that then becomes pervasive in the field." Senior Scientist answered, "Timely to me means that the source is among the most recent set of discussions on a topic. Research areas that are currently being worked on actively, timely might mean sources that have been published in the last few years. Other areas, where work is not so hot, timely could mean even decades old. I most certainly do use older work in my field, because quite often, demonstration that I am familiar with a topic means I have to acknowledge the original thinkers. For example, I cite Darwin sometimes, when his work was the first and still very important to thinking on a topic." Here we have, in both cases, an immediate response that privileges the standard line that "timely is the most recent." This fits the popular understanding of science. Yet both then make distinctions. Senior scientist makes the distinction between subfields where research is active and those where it is not. Subfields that appear to have died can sometimes be re-opened, and in those cases "timely" work may have been done some time ago. Only a practitioner, in fact only one truly interested in the so-called dead subfield, would know what is timely in such a case. Furthermore, both point to "founders," "originators," as important to cite in the construction of an article. Senior Scientist explicitly states that this is to demonstrate his expertise. The social context of science includes both the research questions being asked at present and its history. A librarian who does not pay attention to such a social and narrative understanding of the field, as experienced and constructed by practitioners, would fail to grasp or convey their use of the term "timely".

Junior and Senior Literature Professors have similar understandings. Junior Literature writes, "Of course I look at timely material, but sound research requires that I look for any and all material that covers my specific subject and be able to look beyond what is outdated or outmoded in it." Senior Literature Professor answered, "The first comment I'd make here is, of course, that the term 'timely' has different practical applications depending on the nature of the research… when I'm working from a more theoretical perspective, it might be important to use critical writing that was published at the time when such theories were in vogue…Finally, I always check to see what's been

published within the past ten years on my topic or topics relating to my topic." In Senior's case there is a sophisticated notion of what constitutes "timely" material. In part it is research area dependent and is a "skill" developed only after having worked in the field for some time. There is a degree of implicit knowledge involved. Like the Scientists, the Literature Professors require a disciplinary context in order to identify something as "timely."

Junior Social Scientist I states that timeliness "…is less about the year a work was published and more about its position in the body of knowledge I'm studying. I consider 'timely' to be any part of the literature that hasn't become obsolete (disproven by many others, or generally agreed as overly simplistic). I often do not know what is 'timely' until I've read a lot of the literature in a subfield." Senior Social Scientist answered, "Not quite sure how you are defining timely. For me it may mean that a particular study is addressing an ongoing question in the field and has produced some results that shed some light on the question." In both of these cases knowledge of the field is necessary to determine what is "timely". The Philosophers were more explicit. Junior Philosopher notes, "Timeliness is not an important criterion for evaluating literature in my field, except to the degree that it means being at least to some degree in conversation with recent works, meaning those from the last five decades or so, and especially the last three. I tend to seek at least some works from the last three decades when searching for secondary literature on a topic, but refer just as often to secondary material pre-dating that period." Senior Philosopher agrees, **"**In many areas of philosophy, the secondary literature that is relevant for a project will include both recently published material and material that dates back decades." For Philosophers, "timely" may refer to work published fifty years ago. This is not something a librarian teaching an information literacy class would readily know without some knowledge of the discipline.

What is "timeliness", therefore, in practice? "Timely" is what is taken to be relevant, it is not primarily defined by date of publication. It can only be determined by an understanding of the field itself, or even of a sub-area within a discipline. There are cases when a determination of what is "timely" depends upon the specific research topic. One can identify a timely work only if one knows something about the discipline and the research problems actively being pursued in the field.

Authority

What counts as "authority" among practitioners? For Junior Historian it is largely determined by the ability to read the foreign language in which most of the primary, and much of the secondary, literature in his field is written. Senior Historian had a broader view. "Whether something is authoritative or not is dependent on the nature of the research project. Otherwise authority is determined by the press which has published a book and the nature of reviews." Junior Scientist had a complicated set of criteria. "My criteria for judging authority include the level of peer review given to the work, the believability of the techniques used, and the level of acceptance among other scientists I respect. I usually rely first on journals published by scientific societies that I respect and in which I have membership. Since I am a [Name of subfield]…I look first to the journals published by the [Name of professional associations]. Within these sources I look for other sources which are frequently referenced, in particular articles in the journals Science and Nature (because these two journals are published for a general scientific audience…anything that gets published in these two journals generally has more significance than anything published in a specialized journal)." Peer review and status of journals, notions emphasized in generic skills approaches, are, therefore, only

two criteria. Technique, which specialists alone may judge, and believablity by other experts, a type of implicit or not fully public knowledge, are also important. There exists an even more subtle claim that articles published in general but highly regarded journals may be more significant that those published in narrow, topic-specific journals. This would appear counter-intuitive to many teaching information literacy and is the type of knowledge one can only gain by work in the field or from an active practitioner. Senior Scientist relies on his own expert judgement, based on years of active research in his sub-specialty. “I recognize authorities as people who I think do good work. I review the actual papers they publish and decide whether I think the work is well done or not. There are people in my field who publish a lot, and get lots of grants, whom I do not think do particularly good work, and some who do little but what they do is excellent… I do often read work by people I consider generally not very authoritative, because sometimes even they do good work.” Junior Literature Professor has a more standard view of authority, “Authorities in my field are generally already well-published and/or published only in the best journals and with the best academic presses; they also have name recognition from conferences, invited lectures, etc. Their work indicates the most profound level of academic expertise, reflects substantial research, and typically helps set trends or shifts in the field's focus.” The only qualifications here which only an expert would know are name recognition from conferences and that the work must be substantially good and redirecting. The latter is probably seen as correlating with publication in highly regarded journals but is nonetheless a separate criteron. Senior Literary Professor, active in his field for years, like Senior Scientist relies more on his own knowledge than his junior counterpart, “First, I know the 'big names' in my field, by which I mean the very specific area that I have worked in for twenty-plus. As to whether these big names as well as new-comers are 'authorities' is a thorny question…But for theoreticians, I tend to stick with those that are talked about in journals, websites, and at conferences of scholars in literary criticism that I read and frequent.” Again, besides those he knows of immediately, there are those “talked about” and not just in journals but in conferences and on websites. Such expert knowledge of who is an authority can only come from practice. Junior Social Scientist I, states, “I recognize authority from many places - certainly publication in top tier peer-reviewed journals and good presses is one way. Also, I will often be exposed to scholars repeatedly through articles, conferences and events. I usually trust that someone who is cited consistently or headlines at many conferences is probably an authority.” Senior Social Scientist, like the Senior Literature Professor and Senior Scientist, emphasises her knowledge of the field, “Recognition of an authority has to do with currency - going to conferences, current journals, etc. Knowing who is doing work in the area. Also has to do with experience in the field and knowing who is doing consistent work in any of the sub-disciplines. Recognizing someone new as an authority comes from exhausting the relevant literature in a particular area and getting a sense of the body of work produced by an individual.” Both philosophers claimed to be more egalitarian, recognizing the importance of good work by non-authoritative writers, and yet both also recognize the power of status and in fact, in this case, gave the more conventional answer. Junior philosopher wrote, “Authority is not an important criterion in my field, as it is very much overshadowed by other virtues like plausibility, clarity, and relevance. I do not seek work by authoritative authors. Nonetheless, so as to participate in the discipline's conversations, I tend to emphasize work cited by other work, most of it in the journals normally cited in the standard literature and edited by authors who appear in that literature, or in books from a set of publishing houses recognizable in the same way.” Senior philosopher argued, “Work written by the widely recognized ‘big names’ in philosophy, or more generally by faculty at prestigious research universities, will catch one's eye (and hold one's attention) more readily than work written by lesser-known

people, teaching at less prestigious institutions. However, authors of that latter sort are still frequently read when their essays are published in prestigious or at least solid peer-reviewed journals (as they frequently are) or when their books are published by reputable university presses or other publishers of academic books (as they frequently are).” Both however, reference some knowledge of the discipline, i.e. participation on the “conversation”, knowledge of prestige journals, institutions and publishing houses.

Does one need to know the content of a discipline in order to recognize the authorities in it? In part yes, to know who is engaged at the “most profound level” to know what it means to engage “in the conversation” of the disciplines, to know how to reject those who publish frequently but on trivial topics, requires expert knowledge of content and technique. Equally however, it appears one must know something about the social organization of the discipline. For instance one must have the ability to recognize names largely from conference proceedings and from publications and websites. Knowledge of what constitutes the best publishers in the field and who is highlighting conferences is important. Librarians teaching generic information literacy courses would not, as a rule, know all of this easily, although some of this information, particularly a broad view of the social organization of the field, could be obtained by conversations with active practitioners in the disciplines.

Bias

The discussion of bias produced the most interesting responses. The responses were divided between those who emphasized that bias could be detected and avoided and those who believed that “bias” was simply another word for perspective. The second group held that the major scholarly error was to remain unconscious of one’s own biases and those of others. Junior Historian believed that bias was largely detectable and could be determined by a review of sources. Senior Historian, on the other hand, simply remarked, “Everyone and every article has bias. This is not to be avoided but best to learn how to identify.” Junior Scientist’s response was closest to that of Junior Historian. Senior Scientist, again trusting his own judgement, believed that he could determine bias based on his knowledge of the social organization of the discipline. “Bias, in the context I think you're asking about here, occurs when workers treat papers or proposals by different authors differently on the basis of who they are. For example, there's a big research lab in my field that produces lots of students, and it seems like as the people from this lab move out into other institutions, they tend to be especially generous to other folks who also came from that same institution. There are people I know of who seem to have astonishing success publishing small, mediocre-quality papers in high ranking journals, over and over, and it is hard not to think there's some sort of bias going on.” A perspectivist notion of “bias” is absent from both Scientists’ use of the term. Neither Junior nor Senior Literature Professor avoids biased works. But Junior Literature Professor’s views are closer to Senior Historian, and Senior Literature Professor’s views to those of Junior Historian. Junior Literature Professor wrote, “My field understands that all work is politically implicated; it's typical for authors to acknowledge those implications up front. We do not call it ‘bias’ but instead try to situate the scholar's insight within a framework that makes the political positions implied in it clear…I don't avoid works that are ‘biased’. Typically, I'll see some claims that are tacitly sexist, for instance, and rather than not citing those claims, I'll be sure to note the sexism inherent in them either in a footnote or in my discussion of the source” Senior Literature Professor believes he can detect the bias of others more directly, “Bias in literary criticism usually comes in the form of priviledging one methodology over another equally applicable one, or in applying only one side of an otherwise sound methodology without offering a counter argument, either published or one I offer myself. I don't avoid biased works since

they often provide an opportunity for me to make a case for my own argument as well as pointing out the need for additional scholarship in that particular area." All three social scientists came down clearly on the perspectivist side, indicating that they believed that "bias" is inevitable and that the best one can do is make it explict. Junior Social Scientist I, "Bias is a pre-existing idea or position that shapes our understanding of a research problem or the interpretation of our findings. I think some level of bias is unavoidable in social science. We all approach our research problems from a specific social location. I do, however, think that we should make an effort to put our biases out there for examination with our work." Junior Social Scientist II, "Well, I suppose from my perspective there is always bias in the interpretation of data. So what I look for is work that clearly specifies the form of bias." Senior Social Scientist, "Bias is present in all research. The key for me is whether researchers embrace their bias, claim it in their work and attempt to counter it through inclusion of counter perspectives and the use of methods that might provide contrary data." The philosophers had the most difficulty in coming to a definition of the term. However both saw usefulness in at least some sorts of "biased" works. Junior Philosopher associated it, without any prompting from the wording of the question, with ambiguity, "I read ambigious articles all the time. But I do not think of ambigious works as being more or less biased than others. I do not attempt to avoid biased work. It is some of the most useful work to engage with." Senior Philsopher wrote, "I'm not quite sure how to translate 'bias' into terms that I would be more likely to employ in thinking about books and articles I read. Perhaps the best equivalent is: work that does not adequately address, or even acknowledge, alternative points of view. I think that such work is less likely to be valuable than work that acknowledges, and at least endeavors to address, a range of alternative arguments or interpretations…Moreover, work that is 'biased' in the sense of 'opinionated' can be useful, as long as the argument or interpretation the author is focussed on in a blinkered way is worth thinking about."

Attitudes toward bias fall into several categories. One set of views was that bias can be identified methodologically or by close reading. In this case bias is defined largely as pre-existing ideas that lead one to ignore evidence, an unwillingness to address alternative interpretations in one's work or a preferencing of the works of close colleagues. In order to detect bias one looks for the exclusion of other viewpoints in a text or one employs one's knowledge of the social organization of the discipline. Junior Historian, both Scientists, Senior Philsopher and Senior Literature Professor fall into this category. A second group of scholars believes that "bias" is inevitable, including in their own work, and that the appropriate response is to be conscious of it, to situate one's self, to state one's perspective and to challenge that of others. Self awareness and making explicit the implict are the values espoused here. Senior Historian, all three Social Scientists, and Junior Literature Professor fall into this category. A third category is that of the Philosophers who seem to have trouble translating the term "bias" into something useful for their own practice. A second set of issue emerged as well, beyond giving a working definiton of bias, namely whether the biases of others are useful. Junior and Senior Professors both engage biased works with which they disagree, using them as foils or ways of making a point. Both Philosophers love biased (or "opinionated") works. Junior Historian and both Scientists want to avoid them at all costs.

Does one need to know content in order to determine what is biased in a discipline. First, one needs to know that various views on bias exist and be willing to teach all of them. If one is teaching that bias is identifiable one can simply point out that alterantive views should be incorporated and given their place in a work or that that some knowledge of the social structure of a discipline is necessary to identify some sources of

biases. If one is a perspectivist, however, somewhat more is needed. One still looks for inclusion of other viewpoints in a work but one also tries to make the students aware that the degree of self-awareness and explicitness in the perspectives of authors is important. This may be a matter of style more than content but some engagement with the content of a work will be inevitable. Philosophers' understanding, or lack of a settled definition, of the term "bias" also may point to a discipline where one cannot teach about bias without some knowledge of content and without reference to content. If there is no simple identifable usage of the term in philosophy, if it is sometimes seen as ambiguity (useful) or as blinkered opinion (also sometimes useful) one probably needs to know something about philosophy to teach students how to work with, and around "bias" and how to think about it philosophically.

Verifability

In regard to verifiability, both Historians understood it in terms of access to the primary sources used to produce an interpretation. Junior Scientist held that verifiability was extremely important in her field and that it was possible. Senior Scientist held, on the other hand, that "Very little of the work done in my field is verified, for example, through replication. No one has the time to repeat some one else's experiments, and, if you did, no one would want to publish your replication." He went on to discuss an episode where, as a graduate student, he attempted to publish a paper indicating that a result in the literature could not be replicated. Journals would not publish it and his advisor told him that the burden for disproving a published result was too great. The Literature Professors indicated an uneasiness with the notion of verifiablity. Junior Literature Professor wrote, "Everything in literature is ambiguous, and we typically understand that nobody's work is ever 100% verifiable. We expect to see a certain attention to historical detail, and the more details and evidence a scholar provides, the more verifiable those claims are." Senior Literature Professor viewed the whole issue of verifiabilty in literary criticism to be a dead one and one that was of interest only to structuralists who, in earlier decades "mimicked…the social sciences." No agreement existed among the Social Scientists on the issue. Junior Social Scientist I looked for patterns or concensus among studies and counts that as verification. Junior Social Scientist II assumed that work which has been published is verified, and Senior Social Scientist believed that context variables make verification impossible in her field. Junior Philosopher believed that verifiability was not an issue in his field. Senior Philosopher prefered methods of verification similar to those of historians but in the end chooses not to view it as important to philosophy. He wrote, "But I suppose that my most honest answer here is that 'verifying results' is something more like what scientists and social scientists do than like what most philosophers most often do."

Is the meaning of verifiability content dependent? In a sense it is, namely that on the extremes historians and scientists have different ways of ideally varifying results. One group speaks of repeating experiments and the other of access to primary sources. It also appears more likely that there is no agreement overall as to whether verifiability is possible or important. Teaching about verifiability must recognize both the discipline specific means of verifying (represented best by historians and scientists) and raise all the questions about how it is defined, whether it is an ideal rarely obtained, or whether it is important in every disciplinary context. Teaching it without raisng such issues would be simplistic and would not lead to increased "information literacy".

Logical Consistency

Logical consistency was interpreted by the respondents to mean differing types of "consistencies." For instance, Junior Historian stated, "Logical consistency is important to my research and can be defined as an argument that cross-references a multiplicity of sources in such a way that the reader is left with a new interpretation of the material being reviewed." Senior Historian, perhaps using a logician's meaning of the term and unwilling to reinterpret it simply stated that it was not important in her field. Both Scientists felt logical consistency was important although only Junior Scientist proffered a definition. She wrote, "Yes, logical consistency is important. It is internal reasonableness of conclusions drawn from the data." Senior Scientist held that logical consistency (left undefined) was important because of the lack of replication in his field. For him it functioned as a substitute for replication. Both Literature Professors believed it be important. Only the Junior, however, would elaborate and her elaboration seems to equate logical inconsisteny with ambiguity and also to allow for possible tolerance of it. "I suppose it would be worth citing a source that's ambiguous in some contexts. Intellectual conversations can sometimes ebb and flow with logic, and all work is dialogic. In the interest of furthering knowledge it's useful to consider scholarship that may sometimes err if there are interesting ideas that are worth exploring in it. Flaws in logical thinking may only be hammered out by additional discussion; rejecting a study for that reason seems premature." All three Social Scientists equate "logical consistency" with the agreement of data and theory and with proving what one claimed that one was attempting to prove, i.e. a combination of internal consistency in the assertions of the text and an integration of empirical research with social theory. Junior Social Scientist II wrote, "I always tell students that they should have both the empirical data and a logical explanation for the patterns in their data. The importance of theory etc." Senior Social Scientist put it most succinctly, "Question, method, data and findings should logically cohere." Junior Philosopher taking the strictest meaning of the terms strongly condemns logical inconsistency and would not cite logically inconsistent works. Senior Philosopher had a more nuanced view, rejecting "flat-out self contradiction" but noting that complex works in philosophy sometimes contain interesting contradictions, "To cite a historical example: Some interpret Locke as holding two incompatible accounts of substance… I'll keep reading Locke, partly to find what drives such a smart person to hold contradictory beliefs on the subject of substance."

Here, as with the other terms meaning varies by discipline. In fact, "logical consistency" means very little, in the strictest sense, to most scholars. Rather some form internal agreement of the text matters to most and this agreement, taken as consistency, is measured or identified differently in different disciplinary contexts. It can be an integration of a range of primary sources to support an historical interpretation. It can mean a integration of data and conclusions for the scientist. It can be lack of ambiguity in a text. But ambiguity may not in itself negate the usefulness of a scholarly claim for a literature professor. Social scientists, similar to the Junior Scientist, agreed that it meant integration of method, data, theory and conclusion. Philosophers either took the strict logician's view or looked upon it as a possibilty inherent in complex works, opening up the possibility of further engagement and interpretation. Is there a similarity here? Yes, in the vast majority of cases "logical consistency" means integration of sources or evidence and theory. But what counts as good integration (with the exception of rejecting "flat-out self contradition") is a matter of interpretation and is based on expert knowledge of what constitutes good theory, data, method and reasonable conclusion. It cannot be assessed outside of possession of some prior knowledge of the subject matter. And finally, in two cases, Junior Literature Professor and Senior Philosopher, the abilty to use and explore

"logical inconsistencies" depends on a knowledge of what constitutes the ongoing conversation of one's discipline. In short, teaching about logical consistency outside of disciplinary contexts would be a mistake. Does one need to teach content? Yes, on occasion. Furthermore, one needs to be aware of disciplinary differences in the use of the term.

5. Teaching Information Literacy

This study has shown that the ability to identify timeliness, authority, bias, verifiability and logical consistency, the "critical thinking skills" associated with information literacy, are embedded in disciplinary contexts. It follows that any attempt to teach such skills "generically" would fail to achieve the very goal which Grafstein sets, namely bringing students to an understanding of the knowledge base of a discipline. Dichotomies are often misleading and attempts to show how ones that, as in this case, serve an ideological purpose, break down is not always an easy task. But when reviewed with care the survey responses reveal that in the end the dichotomy of "skills" and "content" in teaching library information cannot be consistently maintained. It is not that librarians will always be teaching subject matter but rather that librarians will not be able to teach such "skills" without referencing the specific and unique practices of disciplines. Another way of putting it is to say that it is only in working with content, with knowledge claims within a discipline, that a practical, use-based, understanding of "skills" becomes possible or even intelligible to the student. Secondly, and in a weaker sense of disciplinary context, it has been shown that librarians will on occasion need to reference the social organization of a discipline.

In the language of Frohmann and the constructionists one would say that if "information" as such does not exist, then it follows that a bounded area of study and teaching called "information literacy" does not exist either. In the overall academic context that which is called "information" are elements of texts which are evaluated, used, misused, and incorporated into other useful products (usually documents such as conference papers, journal articles or undergraduate papers). "Critical thinking skills" likewise are not a single set of skills that one can apply according to a "rule" in all contexts. They are, in reality, practical skills that individuals use within contexts to convince themselves and others that they have successfully achieved the production of a community recognized product. Those practices are learned in a social manner, in the production of products themselves, and in interaction with others. The evaluation of the product, of its forms and claims, again takes place within a community, namely academic disciplines. One question asked by evaluators is whether appropriate and recognizable practices have been followed. We, both librarians and subject faculty, teach in the academy how to produce recognizable and appropriate products.

Furthermore, in the academy the teaching of "information literacy" tied to various types of first-year classes, either for credit, or not for credit, as advocated by Owusu-Ansah, is unlikely to do accomplish this goal. It is especially unlikely to achieve it when tied to a course, such as English composition, which has either no, or a weak, research component and which is almost always marginally connected to the on-going research questions of the discipline. English composition is a particularly bad location to teach information literacy as presented here.

A basic introduction to "skills" as defined by Grafstein, with some reference, nonetheless, to the fact that they are understood and employed differently in different

disciplines can probably be conveyed to first-year or, perhaps better, to second-year, students. Librarians should not pretend, however, that much sophisticated understanding, or ability to produce products will be achieved in such a course. Even courses such as these, however, would require that librarians keep in constant dialogue with expert practitioners in the disciplines in order to be able to present a reasonable approximation of disciplinary uses of the "skills".

Higher level courses, either on-demand, or for credit, would be the only place to fully teach information literacy. When done in connection with discipline-based courses, either as an additional credit or embedded without credit in a higher level course, the clear distinction between the role of the teaching librarian and discipline based faculty cannot be maintained. As noted above, this presents an ideological problem for librarians who want to have a specific area of expertise. However the model advocated here, of disciplinary knowledge-informed cooperation between librarian and discipline based faculty, makes librarians supporters of such faculty, reinforcing their teaching of appropriate forms of knowledge claim evaluation and production. Librarians also often have useful database searching skills which can be utilized and incorporated into such courses. Probably the best places to produce this type of close cooperation are senior classes for majors and in first-year graduate programs. Such higher level instruction, whether on-demand or embedded in the courses taught by other faculty, can work to force students to submit themselves to disciplinary traditions, to enter into a dialogue with practitioners in those traditions and can teach them how to produce acceptable products. Students can be shown that it is only in submission to a tradition of practice that one can, ultimately, when sufficiently skilled, create new knowledge claims and even, in time, redirect or subvert the tradition. Library faculty should consider building close alliances with discipline based faculty who teach higher level courses. Academic librarians are usually required to have advanced degrees in a discipline other than library science. This type of cooperation would provide further justification for such degrees.

Librarians should also be willing to offer for full credit courses which address and express an understanding of information and knowledge as the result of social processes. Librarians' academic legitimacy would be greatly enhanced if such courses and associated scholarship were developed. These "information literacy" classes can teach the social construction of knowledge and would teach students that knowledge is embedded in traditions of work and discourse that has lasted, in some cases, for centuries.

References

Ellis, David. 1993. Modeling the information-seeking patterns of academic researchers: a grounded theory approach." *Library Quarterly* 63: 469-486.

Frohmann, Bernd. 2004. *Deflating information: from science studies to documentation.* Toronto: University of Toronto Press.

Glaser, Barney G. and Anselm L. Strauss. 1967. *The discovery of grounded theory: strategies for qualitative research*. Chicago: Aldine Publishing Company.

Grafstein, Ann. 2002. A discipline-based approach to information literacy. *Journal of Academic Librarianship* 28: 197-204.

Graftstein, Ann. 2007. Information literacy and technology: an examination of some issues. *portal: Libraries and the Academy* 7: 51-64.

Owusu-Ansah, Edward K. 2004. Information literacy and higher education: placing the academic library at the center of a comprehensive solution. *Journal of Academic Librarianship* 30: 3-16.

Tuominen, Kimmo and Reijo Savolainen. 1996. A social constructionist approach to the study of information use as discursive action. In *Information seeking in context: Proceedings of an international conference on research in information needs, seeking and use in different contexts*. ed P. Vakkari et al. London: Taylor Graham.

Tuominen, Kimmo, Reijo Savolainen, and Sanna Talja. 2005. Information literacy as a sociotechnical practice. *Library Quarterly* 75: 329-345.