2011

"Google Reigns Triumphant"?: Stemming the Tide of Googlitis via Collaborative, Situated Information Literacy Instruction

Carol A. Leibiger
University of South Dakota, C.Leibiger@usd.edu

“Google Reigns Triumphant”?:

Stemming the Tide of Googlitis via Collaborative,

Situated Information Literacy Instruction

Carol A. Leibiger

Associate Professor, Information Literacy Coordinator

University Libraries

The University of South Dakota

"Google Reigns Triumphant"?: Stemming the Tide of Googlitis via Collaborative, Situated Information Literacy Instruction[1]

CAROL A. LEIBIGER

University Libraries, University of South Dakota, Vermillion, South Dakota

"Knowing is not the act of an outside spectator but of a participator."

John Dewey, *The Quest For Certainty*

> "We all know what professors do, what librarians do, and what students do. We also know those traditional activities do not work anymore. To admit that is to enter the exciting world where instructors, students, and librarians work together to create innovations in learning."
>
> Larry Spence, "The Usual Doesn't Work: Why We Need Problem-Based Learning"

Abstract: Googlitis, the overreliance on search engines for research and the resulting development of poor searching skills, is a recognized problem among today's students. Google is not an effective research tool because, in addition to encouraging keyword searching at the expense of more powerful subject searching, it only accesses the Surface Web and is driven by advertising. American higher education unwittingly fosters the use of search engines in research by emphasizing results rather than process. Academic librarians emulate teaching faculty in their reliance on lectures, and their course-related instruction is limited in its effectiveness because it is constrained to one-shot, lecture-driven sessions. A more effective way to teach research is to

collaborate with faculty via problem-based and project-oriented learning tasks that incorporate authentic discipline-specific information finding and critical thinking into assignments.

Introduction

In her case study describing the implementation of Problem-Based Learning (PBL) in a university hospitality management course, Berger (2008, 128) claims that students lack critical thinking skills that enable them to do academic research, and she identifies Google as the "main culprit." Overreliance on Google, the most widely used search engine in the world (Vine 2004), affects undergraduates so uniformly that it has been given a name, *Googlitis* (Urban Dictionary 2010). This phenomenon, which seems to have reached epidemic proportions among students, displays the following symptoms: an overreliance on simplistic search techniques using Internet search engines and the extension of these poor searching skills to the use of library resources (Leibiger 2010). The good news: We've diagnosed the problem successfully. The bad news: The disease is more pernicious than we thought. Without early and regular intervention, the disease is likely to affect patients' ability to survive, at least academically and possibly professionally.

This study consists of a literature review and theory-based discussion of aspects of higher education and library instruction that undermine students' development of effective research processes. The discussion further proposes that faculty and librarians collaborate to intervene to prevent the development of Googlitis by creating and facilitating active, situated, problem- and project-based learning assignments that promote effective information-finding and critical-thinking skills in a discipline-specific context via contextualized, real-life, work-related tasks. The success of Problem-Based Learning (PBL) and Project-Oriented Learning (POL) in facilitating information finding, evaluation, and use *and* critical thinking in some disciplines suggests that these methods can be successfully applied to teaching information literacy (IL) in discipline-specific courses in higher education. The application of PBL and POL to IL

instruction is illustrated using a typical assignment from an Organizational Communication course.

Googlitis: Just how serious is it?

While the metaphor of googling as illness might suggest librarian hyperbole, reflecting the fear that libraries will become obsolete in the face of growing user reliance on search engines for information finding, the problem is in fact a serious one that confronts all of higher education as it attempts to teach students how to find and use information for academic, professional, and personal needs. Griffiths and Brophy (2005) determined that students gravitate to search engines even when better-quality library resources are available. In their study, the majority (76%) of students used library web sites to connect to search engines for research (45% chose Google, 9% selected Yahoo!, 6% turned to Lycos, and AltaVista, Ask, and BUBL were used by 4% of students apiece). The only library resource chosen (by 10% of students) was the library catalog.

Subsequent larger studies reflect Griffiths and Brophy’s findings. The OCLC (2006) survey of Internet use by college students determined that, while 85% of college students “completely” agree that library resources like online scholarly journals provide worthwhile information, 90% also admitted that they prefer to use search engines for reasons of convenience and speed. Head and Eisenberg (2009, 32) found that college students prefer a “risk-averse and predictable information-seeking strategy,” using course readings and Google for academic research and Google and Wikipedia to meet their personal information needs. It seems that students have internalized faculty and librarians’ recommendations of library resources over Google; however, other priorities cause them to prefer search engines. The ease and speed of Google searching seems to reward students for following the “principle of least effort” (Jansen, Spink, and Saracevic 2000; Zipf 1949), thus validating poor searching strategies, which students then attempt to apply when they use library resources like scholarly databases. Students fail to

perceive the importance of critical thinking skills that are essential given the many hits they receive while doing unsophisticated searching using Google. Head and Eisenberg (2009, 34) point out an additional, troubling reason for such poor research skills, namely that they are rewarded with “respectable grades.”

Leibiger (2010) has summarized the strengths and weaknesses of Google as a research tool. Google is adequate for accessing information that can be captured with unique names or phrases (Grenzeback 2009; Vine 2004) or finding quick, simple, or the most popular answers that are “good enough” for searchers’ purposes (Abram, 2006). Additionally, Google is helpful when searchers lack access to a research library and can use Google Scholar or Google Books to retrieve information otherwise not available to them (Grenzeback 2009).

When discussing research with students, it is important to articulate the limitations of Google that can negatively affect their ability to find high-quality information efficiently. Since Google taps into only 16% of the content of the World Wide Web (Bergman 2001; Lawrence and Giles 1999), most of which is the “Surface” Web, students are better served by library resources, which comprise part of the “Deep” or “Invisible” Web. The latter also contains proprietary sites, government and research sites, and databases like library catalogs or subscription databases (Gil 2010). Since the Deep Web is the most rapidly expanding part of the Internet, overreliance on tools like Google leaves searchers increasingly unable to locate high-quality web-based information.

Another problem relates to Google’s enabling of unsophisticated searching. Since Google searching is limited to keyword searching, its use promotes poor information-finding strategies that are carried over into the use of library resources. Such resources allow more powerful information-finding techniques such as subject searching and thus provide fewer, more targeted, higher quality hits (Grenzeback 2009). Finally, search engines are businesses that serve primarily

their advertisers rather than searchers (Abram 2006, Vine 2004); Google runs daily experiments on its pages (and users) and as a result is able to feed searchers advertisements aligned with their search terms (Grenzeback 2009). The resulting clutter, at best, slows or impedes searching, and at worst it distracts searchers from the information that they hope to find (Abram 2007).

American higher education, teaching, and learning

To counter students’ use of Google and the resulting poor search strategies that students internalize, it is necessary to rethink how research is taught in higher education. Because research assignments are part of the instructional landscape, this study describes current American higher-education instruction and how academic librarians[2] teach in support of faculty course assignments. The discussion then turns to a “new paradigm” (Johnson, Johnson, and Smith 1991, 1:6) of teaching, one that fosters natural learning of discipline-specific knowledge and information finding, evaluation, and use. In the context of library instruction’s support of teaching and learning at American colleges and universities, improved learning via library-oriented research assignments is possible *if* higher-education faculty and librarians agree on outcomes and methods and collaborate in providing opportunities (in the form of assignments and instruction) for natural learning to their students. The librarian liaison model encourages academic librarians to seek enhanced relationships and opportunities for collaboration with faculty. These relationships provide librarians with greater collaborative roles in shaping research assignments and enable them to offer students natural-learning opportunities to internalize IL skills that are situated in academic disciplines.

The “old paradigm” in American higher education

The standard view of teaching and learning is that they are complementary activities performed by faculty and students in higher education. That is, faculty teaching is equated with student learning. The preferred vehicle of information transfer has been the lecture (Darkenwald

and Merriam 1982), which developed during the early days of university teaching, when textbooks were nonexistent or scarce and expensive, and the faculty functioned as textbooks. With the advent of the research university, teaching was de-emphasized in favor of research (Johnson, Johnson, and Smith 1991). As higher education has become democratized and commoditized, faculty expertise is imparted to increasingly larger audiences of students, and the lecture functions as an efficient, economical way to teach (Allen 1995). The lecture format seems to propagate itself over time as higher-education faculty, who are usually subject specialists without much pedagogical training and who themselves learned via lectures, turn to lectures to educate their own students (Conger 2001).

Educational scholars have pointed out the problems inherent in the lecture approach to teaching, beginning with the assumption that students are clean slates, onto which faculty inscribe their expertise via the spoken word. This approach privileges the lecturer as expert and highest-ranking actor in the classroom hierarchy. It is problematic for students who are not auditory learners, and it favors lower cognitive functions like memorization of facts over higher-order, reflective, critical-thinking processes like synthesis, analysis, and evaluation (Bonwell and Eison 1991). Cheney (2004, 496) points out that “[m]any educators, despite their best intentions, are not teaching students how to think, how to ask questions, or how to use strategies to gather information to answer those questions.”

Lecturing flies in the face of current thinking and research on learning. Knowledge is not a commodity owned by a single expert, but rather the product of group-based social processes and therefore maintained by groups rather than individuals (Johnson, Johnson, and Smith 1991; Kuhn 1996). The underlying assumption that faculty are powerful experts disenfranchises students as active participants in learning and promotes hierarchies and competition within courses. Assessment in the context of this “chalk and talk pedagogy” (Helle, Tynjälä, and

Olkinuora 2006, 294) is fact-based, individualistic, and competitive, and it serves to sort students by grade, assuming that the grade reflects learning and preparedness for a profession or further education (Johnson, Johnson, and Smith 1991).

Students are active participants in learning, as they possess pre-existing learning experiences, styles, and knowledge to draw upon. They are better served by teaching methods that avoid top-down, linear presentations of facts and, alternatively, activate their existing knowledge, allow collaboration and co-creation of knowledge, and call for reflection on what has been learned. Such methods also promote scaffolding, that is, support or assistance of students within learning activities from an instructor or more skilled or knowledgeable group members (Clark and Graves 2005; Lehr 1985; Meyer 1993; Wood, Bruner and Ross 1976). Lecturing with its neglect of process in favor of facts probably contributes to students' use of Google in doing research, as faculty do not highlight research procedures during lectures, reporting instead on the results of research in their fields. This devalues research as process in students' eyes and reinforces their desire to achieve results with little effort. This in turn contributes to students' Googlitis, which is probably at least a partial cause of the declining reference desk traffic in academic libraries. (Gayton [2008] claimed a 32% reduction in reference transactions in academic libraries between 1994 and 2004; since 2004 the National Center for Education Statistics [2007, 2010] records a further decline of 24% in reference transactions).

The "new paradigm": Social constructivist and sociocultural approaches to teaching and learning

Within the instructional context described above, there is a disconnect between the transmission-of-knowledge delivery of information and the expectation that this type of knowledge transfer enables students to produce academic papers or practical projects within their disciplines. Herrington and Oliver (2000, 42) refer to this gap as the "void between theory and

practice.”

The integration of active-learning methods into American teaching is the result of a convergence of movements within education. Vos and de Graaf (2004) point to the combined influence of John Dewey’s (1925) philosophy of experiential learning, cognitive psychology’s research on the relationship between cognitive development and education (Bruner 1960), and humanistic psychology’s attention to student-centered learning (e.g., Rogers1969) in the realization that learning involves active student participation rather than passive absorption of information.

Higher education has experienced a resurgence of interest in effective undergraduate education. *Involvement in Learning,* the final report of the National Institute of Education’s Study Group on the Conditions of Excellence in American Higher Education (1984), set forth twenty-seven suggestions to improve the quality of the undergraduate experience and heighten undergraduates’ engagement in their education. Condition 2 suggests that “[f]aculty should make greater use of active modes of teaching and require that students take greater responsibility for their learning” (27). A Carnegie Foundation study, *Higher Education and the American Resurgence*, examined the potential role of higher education in supporting social, economic, and political renewal and technological advancement (Newman 1985). The American Association for Higher Education (AAHE) hosted several conferences that articulated “Seven Principles for Good Practice in Undergraduate Education” intended to prepare students to understand and deal intelligently with modern life: “Good practice in undergraduate education 1) encourages contacts between students and faculty, 2) develops reciprocity and cooperation among students, 3) uses active learning techniques, 4) gives prompt feedback, 5) emphasizes time on task, 6) communicates high expectations, and 7) respects diverse talents and ways of learning” (Chickering & Gamson 1987, ¶4).

Educational achievement and personal development are associated with the second and third principles (collaboration and active learning) above. Active learning is “the process of having students engag[e] in some activity that forces them to reflect upon ideas and upon how they are using those ideas [and] to regularly assess their own degree of understanding and skill at handling concepts or problems in a particular discipline” (Morris and Arbruster 2003, 5). It develops both knowledge and skills through activities like problem-solving exercises, informal small-group work, simulations, case studies, and role-playing (Auster and Wylie 2006). Active-learning tasks involve students in higher-level thinking about course content, utilizing cognitive functions such as synthesis, analysis, and evaluation, the highest levels of cognitive function and learning in Bloom’s taxonomy (Pundak et al. 2009). Active-learning techniques also enable student learning via differing learning styles. Many active-learning techniques involve collaboration, resulting in cognitive and affective gains, e.g., longer retention of knowledge, greater student attention to problem-solving and learning strategies (metacognition), enhanced ability to think and reason within a discipline, increased accountability for individual learning and group performance, and greater satisfaction with, and higher motivation in, learning (Chickering and Gamson 1987; Cook, Kunkel, and Weaver 1995; Gokhale 1995; Mabry 1995; Oddi 1983; Pundak et al. 2009). Educators have associated active, collaborative learning with civic values like an increased ability to work within groups, and the cooperation and scaffolding that occurs among group members has been associated with higher academic achievement by students, especially weaker ones, across all student demographic groups, including age, class, and ethnic and racial backgrounds (Gokhale 1995; Page and Mukherjee 2000). Faculty who utilize active-learning techniques report greater personal enjoyment in teaching and enhanced professional satisfaction due to the success of their students (Gamson 1994; Pundak et al. 2009; Smith1977).

Problem-based and project-oriented learning

Herrington and Oliver (2000) have identified nine characteristics of authentic learning:

- authentic contexts that reflect the way that knowledge will be used in real life
- authentic activities that are complex, ill-defined problems and investigations
- access to expert performances enabling modeling of processes
- multiple roles and perspectives providing alternative pathways to solutions
- collaboration allowing for the social construction of knowledge
- opportunities for reflection involving metacognition
- opportunities for articulation to enable tacit knowledge to be made explicit
- coaching and scaffolding by the instructor at critical times
- authentic assessment that reflects the way knowledge is assessed in real life

Such an approach, which essentially describes the active-learning methods Problem-Based Learning (PBL) and Project-Oriented Learning[3] (POL), enables learning by individuals within groups as they participate in real-world, collaborative tasks. Learners work at solving problems beyond their individual knowledge and skills levels with scaffolding from group members and faculty, including librarians. PBL and POL teach learners how to learn (Spence 2004).

PBL originated in Canada's McMaster University medical school in the late 1960s. The goal of medical PBL was to equip students with the necessary knowledge base, problem-solving skills, and self-directed learning skills to become competent physicians (Barrows 1996; Caplow et al. 1997). The PBL process consists of five steps performed by learning groups: 1) encountering a problem, 2) determining what learning and kinds of resources are necessary to solve the problem, 3) identifying specific resources and how best to utilize them in learning, 4) using the resources and reporting learning to the group, and 5) assessing progress in learning (Plowright and Watkins 2004; Caplow et al. 1997; Norman and Schmidt 1992; Savery and Duffy

1995).

Project-Based or Project-Oriented Learning (POL), like PBL, begins with a problem, but goes beyond finding a solution; POL expresses learning via a tangible project, a discipline-appropriate artifact (Blumenfeld et al. 1991; David 2008; Helle, Tynjälä, and Olkinuora 2006). POL is used extensively as part of active-learning curricula in skills-based teaching, for instance, in native-language writing and in foreign-language teaching using Shrum and Glisan’s (2005) integrative model. POL’s emphasisis on “student autonomy, collaborative learning, and assessments based on authentic performances…maximize[s] students’ orientation toward learning and mastery” (Thomas 2000). The method provides students with the opportunity to apply knowledge learned in “multiple forms of representation” (Helle, Tynjälä, and Olkinuora 2006, 293); a project lends itself well to fields of study in which the written word is not the only form of communication or an academic paper is not the only artifact of interest.

How do active, collaborative methods like PBL and POL support learning? Social science research has demonstrated the roles of context, shared meanings, and group interaction in learning. Social-constructivist and sociocultural approaches to education recognize that learning is embedded in social experience; groups collectively construct knowledge and shared meanings, and individuals, immersed in a group culture, are constantly learning via interactions with the group and its artifacts (Saturday et al. 2003). These interactions lead to the collaborative creation of knowledge; immersion in a culture of this sort gives rise to constant, natural learning of information and skills necessary to participate fully in the culture. Constructivist and sociocultural educational theorists like Vygotsky (1978) and Honebein (1996) have pointed out that embedding the teaching of skills and knowledge in a context in which they are necessary for the successful completion of tasks within a collaborative community of learners makes learning implicit and unintentional rather than explicit and deliberate; this situated learning (Cobb and

Bowers 1999; Lave 1991; Lave and Wenger 1991; O’Brien 2003) thus mirrors learning as it naturally occurs outside the classroom (John-Steiner and Mahn 1996; Vygotsky 1978). By engaging in group research using appropriate disciplinary resources like reference works, books, research databases, scholarly and professional journals, and communication with experts, with scaffolding provided by faculty and librarians as “metacognitive coaches” (Gallaher 1997, 335), PBL and POL students are introduced to the communities of practice (Lave 1991; Lloyd 2005; Nichols 2009) in their fields and develop appropriate “habits of mind” (Gallagher 1997, 347), i.e., the concepts, research, problem-solving, and critical-thinking skills, as well as necessary interpersonal and teamwork skills, in the context of professional work in their disciplines (Bernstein, Tipping, Bercovitz, and Skinner 1995; Cockrell, Caplow, & Donaldson 2000).

More recent elaborations of PBL and POL include group work-based learning and group field-based consulting (Heriot et al. 2007; Rossin and Hyland 2003), which allow students to engage in collaborative problem solving and project completion while situated within a client organization aligned with their chosen profession. The real-world learning inherent in PBL, POL, and their derivatives (Gijselaers 1996) allow students to engage in “cognitive apprenticeships” (Collins 2006, 47; Brown, Collins, and Duguid 1989, 37), in which they acquire both domain knowledge (factual and procedural knowledge) and tacit knowledge (heuristic strategies, metacognitive strategies, and learning strategies to accomplish discipline-specific tasks, to monitor, assess, and remedy the performance of such tasks; and to learn both domain and tacit knowledge) necessary to participate in their chosen discipline (Collins 2006). Situating instruction in students’ disciplines enables their membership in communities of practice via “legitimate peripheral participation” (Lave & Wenger 1991). Relegated to the periphery of the group or organization by their beginner or apprentice status, learners seek to acquire knowledge and skills that will move them to the central, enculturated, insider roles (Brown, Collins, &

Duguid 1989; Brown & Duguid 1991; Lave 1991).

The success of PBL and its derivative methods not only in producing academic achievement (PBL-trained students learn facts as well as, and retain factual information longer than, traditionally trained students), but in promoting greater problem-solving ability, as well as greater satisfaction and motivation in learning, leads to higher student retention rates (Albanese and Mitchell 1993; Major and Palmer 2001; Norman and Schmidt 1992; Prince et al. 2005; Vernon and Blake 1993). PBL has been so successful in medical study that is has been incorporated into the training of other professions like architecture, business, law, engineering, forestry, human resource management, police science/criminal justice, social work, sociology, education, and library science (Baker 1999; Camp 1996; Dimitroff et al. 1998; Edens 2000; Hughes, Sears, and Clark 1998; Marshall et al. 1993; Plowright and Watkins 2004; Reynolds 2006). Academic librarians reading this article will recognize the overlap between the PBL learning process and the Association of College & Research Libraries' (ACRL) *Information Literacy Competency Standards for Higher Education* (2000), so it should come as no surprise that students in PBL programs use the library significantly more frequently, use better sources, and demonstrate a much closer and more positive relationship with the library and with library research than traditionally educated students (Albanese and Mitchell 1993; Blake 1994; Dodd 2007; Donner and Bickley 1993; Eldridge 1993; Rankin 1992; Saunders, Northup, and Mennin 1985).

Information literacy and American higher education

American higher education has espoused lifelong learning as an educational outcome. This commitment is reflected in the various reports and standards that have been promulgated for higher education since the 1990s. For example, the ability to find, evaluate, and use information is a desirable learning outcome of higher education, according to both the U.S. Department of

Labor's SCANS 2000 Report (1991) and the American Association of College and Universities' LEAP Report (2008). Shapiro and Hughes (1996) have characterized IL as an indispensible set of competencies for informed citizens that enable their participation in a modern information society. Information literacy is explicitly mentioned or implicitly communicated in the standards promulgated by higher education's accrediting bodies. Recognizing that the ability to find and use information efficiently and effectively is a significant component of lifelong learning, the American Association of Colleges & Universities (AAC&U) has endorsed the ACRL's (2000) *Information Literacy Competency Standards for Higher Education*. As the introduction to the ACRL IL Standards (2000, ¶2) stipulates, "[Information literacy] is common to all disciplines, to all learning environments, and to all levels of education. It enables learners to master content and extend their investigations, become more self-directed, and assume greater control over their own learning."

While IL is a recognized, desirable student learning outcome in American higher education, library instruction generally has a reduced presence, limited to support of general-education courses like Freshman English and Freshman Speech. If IL is a mandated component of general education, as is stipulated in the South Dakota state university system's *Baccalaureate General Education Requirements* (2005), there is little in the way of programmatic IL instruction because participation is voluntary in all courses beyond the designated IL-mandated ones, and IL is not included in mandatory disciplinary exit assessment. Even in disciplines or courses that invite participation by academic librarians, such instruction is limited to one-shot bibliographic instruction (BI) sessions that rarely go beyond information-finding in support of a course assignment.

The ACRL (2003) has espoused active learning in its *Guidelines for Instruction Programs in Academic Libraries*, and Hinchliffe and Woodard (2001) include short descriptions

of active and collaborative learning in their chapter on instruction in Bopp and Smith's influential textbook, *Reference and Information Services.* Some academic librarians have espoused active-learning methods (e.g., Allen 1995; Conger 2001; Cook, Kunkel, and Weaver 1995; Dabbour 1997; Dahl 2004; Drueke 1992; Dyckman 1995; Gedeon 1997; Gremmels 1996; Keyser 2000; Krajewski and Piroli 2002; Mabry 1995; Ragains 1995; Ridgeway 1989a and 1989b; Smith 2004; Warmkessel and Carothers 1993; Williams and Cox 1992). However, their instruction is constrained to one-shot IL instructional sessions in support of faculty-designed assignments, taught by a librarian as an add-on to the respective course. Because of time constraints on library instruction, librarians are limited to "tool-based" (Stevens and Campbell 2008) lecturing on information resources. In fact, according to a survey by Shirato and Badics (1997), 94% of academic librarians instruct via lecture.[4] The same survey indicated that librarians also consider lecturing one of the least effective ways to teach IL. Hollister and Coe (2003) surveyed instructional librarians in academic libraries about their preferred teaching methods and discovered that while 96% were familiar with active learning techniques, 97% used the lecture-and-demonstration method of teaching IL, and 85% indicated that they did not consider lectures an obsolete teaching method. Hollister and Coe's respondents agreed that while they were aware of active-learning techniques, they used the lecture because of time constraints and because of the need to respond to faculty instructional needs and desires.

Since librarians often orient an IL session around information finding in support of faculty assignments, such information finding is perceived by students to be associated with the library rather than with the discipline for which the library instruction occurs (Whitehead and Quinlan 2003). Spence (2004, 491) points out that students do not take library research seriously unless it is part of the "intellectual architecture" of their curriculum. When librarians and course instructors do not cooperate to integrate the library activity into the course syllabus or grade, i.e.,

when IL is not “woven into the fabric of the course design, simultaneously furthering the student's information-literacy skills and his knowledge of the subject matter” (Mahaffy 2006, 326-327), they miss valuable opportunities to collaborate in instilling discipline-specific mental habits into students by means of research assignments. Collaboration should not only be required of students; it should be modeled by those disciplinary experts who teach them.

Students who receive library instruction in general-education courses do not as a rule experience reinforcement of IL skills later in upper-division, disciplinary courses. To empower students as lifelong learners and to qualify them for full membership in their chosen communities of practice, IL needs to become part of their upper-division, discipline-specific education. Grafstein (2002) points out that every discipline has its particular epistemological structure and notions of critical thinking; students need to progress from general IL skills to those necessary to evaluate research critically within specific disciplines. Tuominen, Savolainen, and Talja (2005, 329) point out that IL is situated in disciplinary practice, and that it therefore develops in the context of disciplinary or work-place tasks and activities: “From the perspective of a situated understanding of learning and learning requirements, information skills cannot be taught independently of the knowledge domains, organizations, and practical tasks in which these skills are used.” For these reasons, IL should be included in disciplinary teaching in higher education. In recognition of this fact, disciplines such as anthropology, sociology, political science, and psychology have developed their own IL standards (ACRL Anthropology and Sociology Section 2008, ACRL Law and Political Science Section 2008; ACRL Psychology Information Literacy Working Group 2010).

Information literacy and situated library instruction

Discipline-specific IL instruction requires collaboration between librarians and faculty in creating IL assignments that are situated in disciplinary practice requiring information finding

and use. Because constructions of knowledge and standards of critical thinking and reasoning are discipline-specific, faculty need to participate more fully in IL instruction. As disciplinary practitioners, they are situated in their disciplines and its body of knowledge and are aware of the tasks through which their fields train newcomers, co-construct knowledge, and otherwise carry out the work of the discipline. This disciplinary knowledge is not accessible to an academic librarian, unless s/he possesses advanced training or a graduate degree in the relevant discipline. Additionally, the ACRL standards are broadly constructed; Owusu-Ansah (2003, 226) maintains that many of the IL standards and performance indicators are “outside the purview” of librarians. Stevens (2007) maintains that the standards’ breadth provides an impetus for greater faculty involvement in IL instruction, and she urges collaboration between librarians and faculty in IL instruction, which is sought by many librarians. Mackey and Jacobson (2005) point out the different knowledge that collaborators “bring to the table”: instructors possess course, disciplinary, and pedagogical expertise, along with knowledge of students as disciplinary learners, while librarians can provide knowledge of information resources and students as information consumers. These complementary areas of expertise allow librarians and teaching faculty to develop research assignments that are “embedded within a meaningful disciplinary context, challenging students to engage with…questions, discourses, and scholars that are important in the field, mapped to the ACRL standards…and compatible with the library’s current resources and services” (Stevens and Campbell 2008, 232-233). Finally, as Smith (1997), Whitehead and Quinlan (2003), and Leibiger (2011) point out, the perceived need for IL in higher education has exceeded librarians’ ability to provide instruction, resulting in a “need to treat information literacy as part of the curriculum not simply part of the library” (Whitehead and Quinlan 2003, 23). Teaching faculty are increasingly willing and eager to collaborate with librarians on active-learning IL activities situated in their disciplines (see, for example, Carlson

and Miller 1984; Kohl and Wilson 1986; Marfleet and Dille 2005; Stevens and Campbell 2007 and 2008; Tierno and Lee 1983; Warmkessel and McCade 1997), and some faculty have successfully taken this instruction upon themselves (see, e.g., Foster 2003; Quarton 2003).[5]

Situated library instruction and Problem-Based or Project-Oriented Learning

A small but enthusiastic group of academic librarians has applied PBL and POL to library instruction in an effort to initiate situated learning of IL skills. Dahl (2004) has developed a scenario-based active-learning model that supports the acquisition of IL in one-shot freshman library orientation sessions. Berger's (2008) case study of the introduction of situated learning into a hospitality management course demonstrates the impact of locating IL instruction within topics that are professionally relevant to students. Immediacy, disciplinary situatedness, and implicit learning of IL skills are the characteristics of PBL and POL as they have been applied to the one-shot library session (see, for example, Carder, Willingham, and Bibb 2001; Cheney 2004; Fosmire and Macklin 2002; Kanter 1998; Kenney 2008; Lindstrom and Shonrock 2006; Macklin 2001and 2002; Mellon 1984; Munro 2006, Oberman and Linton 1982; Ohles 1997; Pelikan 2004; Snavely 2004; Spence 2004; Tuckett and Stoffle 1984).

PBL provides librarians with the opportunity to integrate their instruction seamlessly into a course or disciplinary curriculum (Kenney 2008; Macklin 2001), as students "experience the content, thinking, skills, habits of mind, and concepts of [a] field of study" (Gallagher 1997, 347). Because PBL presents students with actual problems from their disciplines, learning of research skills via PBL is an implicit part of learning the field's practices (Munro 2006). Librarians can use PBL to initiate the teaching of critical-thinking skills, thus extending library instruction beyond information finding and use (Macklin, 2001). Student realization of the value of library resources is driven home by personal or group discovery, and the library's—and the librarian's—important role in students' evolving citizenship in, and mastery of, their fields is

made obvious (Lindstrom and Shonrock 2006). While librarians are a modest group that does not seek the limelight, another important contribution of PBL is the enhancement of librarians' position within higher education, as they play collaborative co-educator roles with faculty in students' disciplinary and cognitive development (Kanter 1998; Kenney 2008; Lindstrom and Shonrock 2006; Ohles 1997; Watkins 1993). This reinforcement of librarians as educators is especially important and necessary in today's volatile higher-education climate, in which librarians' faculty status seems to be coming under scrutiny by administrators and governing bodies.

Unfortunately, academic librarians are constrained by their roles as providers of course-related library instruction within faculty courses. PBL-type library sessions tend to fall within the same time allotment as one-hour, one-shot IL sessions, so that their effectiveness is limited to what can be accomplished within that short time. Enger and associates (2003) have demonstrated that several, longer sessions are necessary to achieve the type of active learning that characterizes PBL (for example, two, seventy-five minute sessions produce more learning using the PBL process than a single one-hour session). Pelikan (2004) suggests longer library sessions (from ninety minutes to three hours in length) to accomplish PBL lessons, but such extended sessions are difficult to arrange with busy faculty and students.

While PBL and POL are effective teaching and learning methods, they need to be implemented by librarians and faculty in a different way than is possible in a traditional one-shot IL session. Library instruction must change to allow PBL to function effectively. Specifically, academic librarians need to collaborate with faculty in creating assignments that foster natural learning, and they need to provide students with adequate instructional support to accomplish these assignments. These developments require the rethinking and restructuring of course-related or –embedded library instruction to discipline-situated assignments facilitated by teaching

faculty and librarians. The remainder of this article will discuss research assignments and instruction and how librarians and faculty can revise them to support discipline-situated learning.

Traditional research assignments: The good, the bad, and the ugly

Academic librarians are regularly called upon to support research assignments, via both course-related instruction and at the reference desk. Since they often do not participate in the creation of these assignments, librarians frequently first become aware of them when students appear at the reference desk requesting research assistance. Such assignments provide opportunities for point-of-need IL instruction. Unfortunately, the average research paper offers little opportunity for learning, as the following assignments, one a generic assignment (Figure 1, based on Mahaffy [2006, 324]) and the other (Figure 2) a more situated assignment demonstrate:

Figure 1

This assignment does not promote natural learning, as it provides no context or justification for the writing of the paper beyond the fulfilling of a course requirement, nor is the assignment relevant to the student’s current academic or future situation, beyond the need to attain a certain grade, pass a certain course, or move beyond a certain semester in a student’s academic career. There is no real-life reason for a learner to choose a topic or use the kinds and numbers of resources prescribed by the assignment. When students engage in library instruction or seek assistance from the reference desk, this kind of assignment becomes a “numbers game” for both the student and the librarian. The student must accumulate the proper number and kinds of sources (regardless of their appropriateness for the topic), and the librarian is caught up in the numbers-sources game to help the student, with little or no attention paid to source evaluation, critical thinking, or effective use of sources (Leibiger 2010). Since students are told how many and what kinds of sources are required, they are prevented from engaging with ACRL Standard 1 (awareness of the kind(s) of information needed and their sources). Head and Eisenberg (2009,

34) criticize such course-related research assignments that “indirectly encourage students to half-heartedly engage in a narrow exploration of the digital landscape (e.g., assignments that state requirements such as, ‘must use five sources cited in your paper’).” The assignment privileges finding of sources (ACRL Standard 2) over other important IL processes and seems to disregard Standards 3 (evaluation) and 4 (effective use of information). The assignment only addresses one aspect of Standard 5, i.e., the ethical use of information, in promising severe punishment of plagiarism.

Some assignments require little or no library research, and consequently little IL instruction is involved, as students do not come to the reference desk or receive library instruction, even though source research using library resources could improve such assignments. An example is the following typical field-observation assignment from an organizational communication course (Figure 2): [6]

Figure 2

This assignment is also problematic when examined in the light of natural learning and the ACRL Standards. The context of this assignment is the students’ course rather than their chosen profession, and its goal is the production of an academic research paper. The lack of real-life context denies students participation in any community of practice involving organizational communication outside of academia. Because students work individually on this project, as with the generic research paper described above, they miss the learning that can occur in collaboration with others, especially the scaffolding that more expert students can provide weaker members of a group. Also, because the assignment is done as a purely academic exercise, the organization that participates in this observation derives no benefit from the research. Finally, because students are limited in their resources to the course readings, there is little opportunity to engage with the larger disciplinary literature on communication within the students’ chosen

organizations. Students are restricted to the information that their expert instructor has provided for them; they are not encouraged to find information on their own. Since, as Head and Eisenberg (2009) have demonstrated, students prefer to use course readings for academic research, this assignment fails to create a need for them to experience and learn from appropriate disciplinary resources beyond textbooks and assigned course readings. This assignment, because it limits the information with which students can proceed, fails to support effective IL instruction; students engage with few facets of the ACRL Standards when completing this assignment.

Students could benefit from research that prepares them for their observation by making them aware of potential communication issues in their chosen organizations. Lacking scholarly source research, the assignment privileges observational research over library resources on the organizational context, and the assignment is thus not helpful even to those students who envision an academic career. Source research is at least important for a literature review in a scholarly paper or article, and such research in the context of this assignment offers students an opportunity to engage in critical thinking *vis à vis* the field’s writings on the type of organization under investigation. Source research facilitated by a subject specialist librarian could quickly and efficiently teach students discipline-specific research and enrich this assignment with information that would support and enhance the observational analysis.

Powerful Information literacy assignments

Jacobson and Mark (1995) point out the need for academic librarians to expand IL instruction beyond information-finding sessions to other areas of the research process and recommend collaboration with course faculty in the creation of assignments and in teaching IL skills beyond catalog and database searching. Palscinar and associates (1989) demonstrate the value of collaboration with faculty in the interest of promoting student active, collaborative

learning. Academic librarians possess disciplinary knowledge and advanced information-finding skills, and they are cognizant of IL standards and teaching methods, all of which can be beneficial to faculty seeking to create discipline-embedded research assignments. The liaison model currently prevalent in academic libraries supports the role of the librarian as information and instructional specialist who plays an active and collaborative role with departmental faculty in enhancing disciplinary instruction via effective library assignments (Rader 2001). The creation of PBL- or POL-type assignments that are situated in a discipline enables collaboration between teaching faculty and academic librarians in teaching IL via effective active, collaborative library assigments.

Creating PBL/POL learning scenarios

Creating situated, problem-based or project-oriented, discipline-specific assignments that reinforce IL skills is not difficult if faculty and librarian subject specialists/liaisons cooperate in their creation. Both faculty and subject specialist librarians are aware of the skills and subject knowledge that need to be taught in discipline-based courses; these areas are generally explicitly taught in classes and course assignments. Most academic libraries have lists of subject specialists available on their web pages (for instance, http://www.usd.edu/library/subject-specialists.cfm has a list of the University of South Dakota University Libraries’ subject-specialist library faculty). The liaison model calls for subject specialist librarians to be visible and proactive in their liaison departments and programs.

To create a problem-based assignment, faculty and librarians need to begin with the desired results, i.e., the targeted disciplinary knowledge and skills expressed as student learning outcomes. Academic librarians can make faculty aware of the IL learning outcomes articulated in the ACRL *Information Literacy Competency Standards for Higher Education* (2000). Subject specialist librarians are also aware of ACRL’s discipline-specific IL standards (e.g., in

anthropology, political science, psychology, and sociology). The ACRL Instruction Section (2010) maintains a wiki, *Information Literacy in the Disciplines*, which collects IL standards, professional standards, and resources that support subject-specific IL instruction for many disciplines including the social sciences. Discipline-specific professional standards can also function as IL student learning outcomes, especially as they relate to information-finding, evaluation, and use and critical thinking as well.

Once learning outcomes have been selected, a real-life scenario, problem, or task from the discipline that students are likely to encounter professionally or personally can be selected or developed. Duch (1996) lists the following characteristics of effective learning scenarios:

1. An effective problem must first engage students' interest and motivate them to probe for deeper understanding of the concepts being introduced. It should relate the subject to the real world, so that students have a stake in solving the problem.
2. Good problems require students to make decisions or judgments based on facts, information, logic and/or rationalization. Students should be required to justify all decisions and reasoning based on the principles being learned. Problems should require students to define what assumptions are needed (and why), what information is relevant, and/or what steps or procedures are required in order to solve them.
3. Cooperation from all members of the student group should be necessary in order to effectively work through a good problem.
4. The questions in the problem should have one or more of the following characteristics so that all students in the groups are initially drawn into a discussion of the topic:
    - open-ended, not limited to one correct answer
    - connected to previously learned knowledge
    - controversial issues that will elicit diverse opinions

This strategy keeps the students functioning as a group, drawing on each other's knowledge and ideas, rather than encouraging them to work individually at the outset of the problem.

5. The content objectives of the course should be incorporated into the problems, connecting previous knowledge to new concepts, and connecting new knowledge to concepts in other courses and/or disciplines.
6. In addition to these characteristics, good problems should challenge students to achieve higher-level critical thinking (i.e., analysis, synthesis, and evaluation in Bloom’s Taxonomy).

To support IL learning, the scenario should require information finding and critical thinking as a natural or normal part of the activity and necessary for its successful completion. An important characteristic of the scenario is that it be “fuzzy” or ill-defined, so that students are required to engage in problem-solving and planning (metacognition) within the context of their discipline’s community of practice and thus learn how the discipline engages with and solves such problems. This provides the opportunity for cognitive apprenticeship. Group work enhances opportunities for collaboration, scaffolding, and co-construction of knowledge. There are numerous web sites provided by organizations and universities that espouse PBL, and these sites can be consulted to find learning scenarios or to obtain guidance in creating one’s own problem-based scenario (see, for example, the Buck Institute for Education’s *PBL Do-It-Yourself*, the George Lucas Educational Foundation’s Edutopia Project-Based Learning Group, the Higher Education Academy’s *PBL Directory*, and the University of Delaware’s *PBL@UD*, which features a PBL Clearinghouse of problem-based scenarios and articles on PBL).

Once students are engaged in the problem-based task, faculty should allow time for collaboration, reflection, articulation, sharing, and resolution of multiple points of view. In this

problem-based model, the course instructor and the librarian each becomes the “guide on the side” rather than the “sage on the stage” (King 1993, 30), providing support and modeling expert disciplinary behavior rather than functioning as the privileged conduits of disciplinary information to students in the course. Duch (1996), Carder, Willingham, and Bibb (2001), and Macklin (2001) provide examples and advice on creating problem-based scenarios and guiding students through active, collaborative learning via authentic, situated assignments.

In creating PBL-type assignments, faculty and librarians also need to consider authentic assessment of learning. Marcum (2002) points out the need to incorporate workplace competencies into academic IL instruction. Herrington and Oliver (2000) stress that authentic learning tasks need to be created with real-life assessment in mind. Therefore, students should be assessed via authentic projects using the standards of the discipline or the professional workplace. Additionally, because discipline-embedded IL instruction needs to focus on teaching disciplinary knowledge as both facts and process, students should be evaluated not just on results, but also on process during their completion of the assignment.

Using the IL standards to determine student learning outcomes and Herrington and Oliver’s (2000) characteristics of authentic, situated learning to create a real-life teaching scenario, the course instructor and a subject specialist librarian can revise the organizational communication assignment discussed above as an active, situated-learning PBL/POL exercise (Figure 3):

Figure 3

This exercise is a group field-based learning version of POL, in which students engage with a problem, then participate in observational research in the field (i.e., within the organization) and finally express their learning in an authentic product. It is less detailed than the earlier version of the assignment presented above, and this brevity is due to an intentional gap,

which becomes part of the problem that students need to solve (i.e., How should they create a plan to carry out the field work? How should they do the preliminary research, and how should that information be integrated into the observation? How should they use the source and observational research to create the final product?). The task is loosely defined, allowing the group to engage in metacognition and determine its own process that will give rise to the final product. Information finding and use are integrated into and critical for this assignment, which calls for source research to provide knowledge of the organizational context and communication issues associated with that context that can inform the observational field work. This assignment requires students to plan and carry out their information finding, evaluation, and use in a manner appropriate for their discipline and thus supports both the ACRL Standards and disciplinary standards.

In this scenario, the course instructor can function as the ComConsult CEO, soliciting campus or community organizations that have an actual need for organizational communication consultants as clients. The group work is thus couched in terms of a real-life task that graduates would encounter in a work situation. Performing a genuine service to the organization being observed heightens both the authenticity of the task and its value to all participants. The timeline is not the artificial one of the academic semester, but of months. If necessary, students can call upon the course instructor and an academic librarian/subject specialist for scaffolding and the modeling of expert behavior in discipline-specific information finding and use, critical thinking, and creation and presentation of the final product. The librarian, who has collaborated with the course instructor in the creation of the assignment, also functions as an expert consultant for the student learning group, facilitating the preliminary research and any further research that the group feels it needs to carry out the project, as well as the evaluation and use of information in the creation of the group report.

Student assessment

Higher education is imbued with the culture of assessment, and IL instruction can benefit from the assessment of students’ situated IL assignments, especially if the assessment functions to improve instruction. Ideally, academic librarians should be involved in the grading of any assignments in whose creation they have collaborated.

Assignments that are intended to reinforce IL skills need to be assessed with attention to those skills. If particular IL learning outcomes have been chosen for an assignment, students need to see that the desired behavioral outcomes are addressed in grading criteria. Fortunately, this is easily accomplished for IL assignments. The AAC&U (2010), in espousing IL skills as learning outcomes of higher education, has produced an IL grading rubric that is available online. The rubric enables the assessment of students according to each of the five ACRL IL standards along four levels of competence (Benchmark, Milestone 1, Milestone 2, and Capstone), which can be aligned with stages in students’ academic careers or disciplinary or professional development. The rubric lends itself to use in grading both traditional research assignments and situated, collaborative ones.

Librarians, as IL experts, can also participate in grading the project (in this case, the organizational communication report) as a *research* project *per se* since they have participated in and observed the group research, or they can take part in the overall grading of the project. Group work can be graded holistically (i.e., the product can be graded and a single grade assigned to the group), but individual performance and effort should also be included for each individual, based on faculty, librarian, and group member observation, in order to discourage “slackers” (Snavely 2004). Including IL within a holistic grade reinforces the importance of the research process within the students’ work on the project. Of course, the client organization can also provide input to the project grade, at least in terms of its satisfaction with the project report.

Continuous improvement via formative assessment

Ideally, students should participate in numerous PBL-type assignments throughout their course of study. This trains the mind to engage automatically in problem solving in course work and in later professional and personal situations. Repetition also allows instructors and librarians increased opportunities to collaborate on PBL-type assignments and engage in situated learning with students (Cheney 2004; Pelikan 2004; Spence 2004). Any such research assignments should be evaluated by all participants, and comments should be used to improve the assignments. By providing feedback, students also participate collaboratively in the continuous improvement of learning scenarios, problems, and projects.

Situated learning assignments and IL instruction

The discussion of library instruction above indicates that academic librarians are constrained by the small amount of time that they are provided for IL instruction in higher - education courses. Generally, faculty allocate one class session to library instruction. This time constraint causes many librarians to resort to lecturing, in order to make best use of limited instructional time. Others engage in active-learning and PBL methods, but the time constraint often limits the teaching to information finding for a specific assignment.

PBL enables librarians to play two important roles in instruction, and these roles can serve to enhance their position in higher education. First, they can collaborate with faculty in the creation of problem-based or project-based assignments. This synergy is beneficial for both parties. Faculty gain from working with academic librarians who are expert information specialists with pedagogical experience of IL instruction. The likelihood that students will learn IL skills when the relevant assignment is created by a faculty member and a librarian who also specializes in the course discipline is heightened when the two collaborate. Second, having librarians support a discipline-situated assignment ensures that IL skills will be taught with due

attention to the disciplinary context. The resulting collaboration is invigorating for both parties, as Cheney (2004), Kenney (2008), Lindstrom and Shonrock (2006), Pelikan (2004), Spence (2004), and Stevens and Campbell (2007 and 2008) have reported.

A situated learning assignment like the one above can best be handled by librarians outside of classroom instruction, thus removing the problem of time constraints imposed by the one-hour, one-shot library session. In the PBL model, learning groups are assigned tutors and librarians who scaffold their information finding and problem-solving and thus their learning (Eldridge 2004). Students engaged in the type of situated assignment described above are primed to make good use of the subject-specialist librarians associated with their academic departments, who can function as expert information finders and disciplinary tutors to assist students in learning about their organizations and the communication issues associated with them, as identified and analyzed by scholars. Students thus benefit from a situated assignment and more time on task with a subject specialist supporting their learning in order to enhance their success as researchers. Librarians gain stature as both co-instructors with faculty and metacognitive coaches for students in the PBL model (Gallagher 1997; Macklin 2000). This increased visibility and connection with higher education’s teaching mission is a positive development when compared with the adjunct status that currently accrues to many academic librarians as they support faculty assignments, without having played any role in creating or vetting them as tools for IL instruction or in supporting them beyond providing short course-related library sessions devoted to information finding. Students and faculty can be counted on to “talk up” the kind of instruction in which librarians are fully integrated as collaborators and instructors committed to students’ disciplinary success. This kind of “buzz” is the best marketing that a library instruction program could wish for.

Another source of support for situated learning assignments is the reference desk.

Assignments that emphasize both the research process and disciplinary knowledge will bring students to the reference desk for assistance, especially if the assignment is crafted so as to privilege both resources that disciplines value (not Google!) and the research process over results. Rethinking research assignments so that students have strong disciplinary reasons to use high quality information sources will bring students to the reference desk and work against the “end of reference” that is regularly proclaimed in the library professional literature (Gayton 2008). Saunders (2003) has argued that effective IL instruction brings students to the reference desk for assistance. PBL-based instruction, which focuses on the resources and research processes used by disciplinary experts, has been documented as producing greater incentives to use the library and steering students to better resources than has traditional teaching (Albanese and Mitchell 1993; Rankin 1992; Saunders, Northup, and Mennin 1985). Professional librarians staffing the reference desk support faculty teaching and student research success, providing free marketing for the library. At the root of these instructional developments is the collaboration by faculty and librarians in creating assignments that allow liaisons to “shine” as disciplinary coaches.

Conclusion: Combatting Googlitis via collaborative IL instruction

The answer to the problem of Googlitis in higher education is not to forbid the use of Google by students. Rather, a discussion of the pros and cons of relying on Google for research is necessary within the context of course and disciplinary research. Allowing students to use Google or other search engines when appropriate and pointing out the limits of search engines in accessing quality information located in the Deep Web can lead to nuanced discussions about research and the need for IL skills. Having students compare information on academic subjects gleaned from search engines with that obtained via research databases during active learning

sessions can provide the impetus for a better understanding of the appropriate utilization of tools to accomplish specific tasks using the Web.

Providing IL instruction via situated, discipline-specific assignments crafted and facilitated collaboratively by faculty and librarian subject specialists offers students the point-of-need impetus to learn both the knowledge and skills that enable and entitle them to participate in their chosen disciplinary communities of practice. Making IL skills an implicit part of any discipline-based task or problem grounds information finding in the epistemology and practice of the field. Enhancing students' IL skills within the context of disciplines has a positive effect on students' information-finding and critical-thinking abilities and enhances their ability to deal with information in academic, professional, and personal matters. Students discover for themselves the value of library resources and the paucity of high-quality information available through Internet search engines. Finally, by engaging students in discussions about research and resources and by reinforcing students' IL skills via powerful assignments in upper-division courses, faculty and librarian experts can collaboratively intervene to deter Googlitis and render students *Googledexterous* rather than *Googleimpaired* (Urban Dictionary, 2010).

[1]I wish to thank the following individuals for their contributions to the writing and revision of this article: my faculty colleagues in the University of South Dakota's University Libraries, with whom I have engaged in discussions of situated teaching and learning in my capacity as Information Literacy Coordinator, especially my instructional colleague, Prof. Alan Aldrich; Prof. Bruce Kelley of the University of South Dakota's Center for Teaching and Learning, who has provided me with a forum for teaching about situated learning of IL skills in which I have received valuable feedback on my workshops and assignments; the Michelle Rogge Gannon and the participants in the Dakota Writing Project who critiqued my situated IL assignments during

the summer workshops of 2010 and 2011, Freshman English Composition teaching assistants Virginia Haines and Dan Schweitzer, who experimented with situated learning assignments in their courses as a result of my teaching in the Dakota Writing Project; and two anonymous reviewers who provided valuable concrete suggestions for improving the original manuscript of this article. All inaccuracies and errors are, of course, my responsibility.

[2]I use the term *academic librarian* to encompass the various statuses that librarians inhabit in higher education: full-fledged library faculty, adjunct faculty, and non-faculty academic librarians.

[3]What I designate as Project-Oriented Learning is more commonly called Project-Based Learning (PBL). In this article, I refer to this method as Project-Oriented Learning (POL) to differentiate its acronym from that of the more widely known Problem-Based Learning (PBL).

[4]Gremmels (1996, 89) aptly describes the lecture approach to IL instruction with the metaphor of the dump truck, which librarians “load as full as [they] can, back…up to the classroom, and unload…onto [their] students, burying them in teaching.”

[5]Smith (1997) argues that declining numbers of academic librarians, increasing demand for library instruction , and the need to integrate IL throughout the curriculum entails new functions for teaching faculty and librarians, as disciplinary IL trainers and IL instructional experts/consultants, respectively. Leibiger (2011~~)~~ echoes this call for a realignment of teaching responsibilities, pointing out the different teaching and communication channels that can be used to “train the trainer.” While the implementation of these suggestions would certainly further attempts to situate IL in disciplinary instruction, these developments are beyond the scope of this study.

[6]This assignment, while situated in the field of organizational communication, is typical of research assignments in many social sciences disciplines.

REFERENCES

Abram, Stephen. 2007. Competing with Google in a special library. In *Out front with Stephen Abram: A guide for information leaders*, edited by J. A. Siess and J. Loring, 85-88. Chicago: American Library Association.

Allen, Eileen E. 1995. Active learning and teaching: Improving postsecondary library instruction. *Reference Librarian* 51/52:89-103.

American Library Association. Presidential Committee on Information Literacy. 1989. *Final report*. American Library Association. Accessed September 28, 2010. http://www.ala.org /ala/mgrps/divs/acrl/publications/whitepapers/presidential.cfm.

Ames, Carole. 1992. Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology* 84 (3): 261-271. doi: 10.1037/0022-0663.84.3.261.

Association of American Colleges & Universities. 2008. Our students' best work: A framework for accountability worthy of our mission. [LEAP report]. 2nd ed. Washington, DC. Accessed September 28, 2010. http://www.aacu.org/publications/pdfs/ StudentsBestReport.pdf.

Association of American Colleges & Universities. 2010. Information literacy VALUE rubric. Washington, DC. Accessed November 26, 2010. http://www.aacu.org/value/rubrics/ pdf/InformationLiteracy.pdf.

Association of College & Research Libraries. 2000. Information literacy competency standards for higher education. American Library Association. Accessed September 28, 2010. http://www.acrl.org/ala/mgrps/divs/acrl/standards/informationliteracycompetency.cfm.

Association of College & Research Libraries. 2003. Guidelines for instruction programs in academic libraries. American Library Association. Accessed November 24, 2010. http://www.acrl.org/ala/mgrps/divs/acrl/standards/guidelinesinstruction.cfm.

Association of College & Research Libraries. 2010. Introduction to information literacy. American Library Association. Accessed September 28, 2010. http://www.ala.org/ala/mgrps/divs/acrl/issues/infolit/overview/intro/index.cfm.

Association of College & Research Libraries Anthropology and Sociology Section. 2008. Information Literacy Standards for Anthropology and Sociology Students. American Library Association. Accessed November 24, 2010. http://www.acrl.org/ala/mgrps/divs/acrl/standards/anthro_soc_standards.cfm.

Association of College & Research Libraries Instruction Section. 2010. Information literacy in the disciplines. American Library Association. Accessed November 24, 2010. http://wikis.ala.org/acrl/index.php/Information_literacy_in_the_disciplines.

Association of College & Research Libraries Law and Political Science Section. 2008. Political Science research competency guidelines. American Library Association. Accessed November 9, 2010. http://www.ala.org/ala/mgrps/divs/acrl/standards/PoliSciGuide.pdf.

Association of College & Research Libraries Psychology Information Literacy Working Group. 2010. Psychology information literacy standards. American Library Association. Accessed October 14, 2010. http://connect.ala.org/files/29837/info_lit_psych_pdf_4a60828636.pdf.

Auster, Ellen R., and Krista K. Wylie. 2006. Creating active learning in the classroom: A systematic approach. *Journal of Management Education* 30 (2):333-353.

Baker, Lynda M. 1999. "Use of Problem-based learning in a basic reference course." *Journal of Education for Library and Information Science* 40 (1):66-69.

Berger, Monica. 2008. Critical thinking is a life relevancy: A hospitality management student case study. *College & Undergraduate Libraries* 15 (1/2):127-140.

Bergman, Michael K. 2001. The Deep Web: Surfacing hidden value. *Journal of Electronic*

Publishing 7. http://quod.lib.umich.edu/cgi/t/text/text-idx?c=jep;view=text;rgn=main;idno=3336451.0007.104.

Bernstein, Peter, Jane Tipping, Kim Bercovitz, and Harvey A. Skinner. 1995. Shifting students and faculty to a PBL curriculum: Attitudes changed and lessons learned. *Academic Medicine* 70 (3):245-247.

Blake, Jennifer. 1994. Library resources for Problem-Based Learning: The program perspective. *Computer Methods and Programs in Biomedicine* 44:167-173.

Blumenfeld, Phyllis C., Elliot Soloway, Ronald W. Marx, Joseph S. Krajcik, Mark Guzdial, and Annemarie Palincsar. 1991. Motivating Project-Based Learning: Sustaining the doing, supporting the learning. *Educational Psychologist* 26 (3/4):369-398.

Bonwell, Charles, and James Eison. 1991. *Active learning: Creating excitement in the classroom*. *ASHE-ERIC Higher Education Report 1*. Washington, DC: George Washington University.

Brown, John Seely, Allan Collins, and Paul Duguid. 1989. Situated cognition and the culture of learning. *Educational Researcher* 18 (1):32-42. http://www.jstor.org/stable/1176008.

Brown, John Seely, and Paul Duguid. 1991. Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation. *Organization Science* 2 (1):40-57.

Bruner, Jerome S. 1960. *The process of education*. Cambridge: Harvard University Press.

Buck Institute for Education. PBL do-it-yourself. Accessed June 20, 2011. http://www.bie.org/diy.

Camp, Gwendie. 1996. Problem-Based Learning: A paradigm shift or a passing fad? *Medical Education Online* 1 (2):1-6.

Caplow, Julie A. Hughes, J. F. Donaldson, Carol Anne M. Kardash, and Michael Hosokawa. 1997. Learning in a problem-based medical curriculum: Students' conceptions. *Medical Education* 31:440-447.

Carder, Linda, Patricia Willingham, and David Bibb. 2001. Case-based, problem-based learning: Information literacy for the real world. *Research Strategies* 18:181-190.

Carlson, David, and Ruth H. Miller. 1984. Librarians and teaching faculty: Partners in bibliographic instruction. *College & Research Libraries* 45 (6):483-492.

Cheney, Debora. 2004. Problem-Based Learning: Librarians as collaborators. *portal: Libraries and the Academy* 4 (4):495-508. http://muse.jhu.edu/journals/portal_libraries_and_the_ academy/v004/4.4cheney.html.

Chickering, Arthur W., and Zelda F. Gamson. 1987. Seven principles for good practice in undergraduate education. *AAHE Bulletin* 39 (7):3-7.

Clark, Kathleen F., and Michael F. Graves. 2005. Scaffolding students' comprehension of text. *Reading Teacher* 58 (6): 570-580. http://search.ebscohost.com/login.aspx?direct=true &db=aph&AN=16402279&site=ehost-live.

Cobb, Paul, and Janet Bowers. 1999. Cognitive and situated learning perspectives in theory and practice. *Educational Researcher* 28 (2): 4-15. http://www.jstor.org/stable/1177185.

Cockrell, Karen Sunday, Julie A. Hughes Caplow, and Joe F. Donaldson. 2000. A context for learning: Collaborative groups in the Problem-Based Learning environment. *The Review of Higher Education* 23 (3):347-363. http://muse.jhu.edu/journals/review_of_higher_ education/ v023/23.3cockrell.html.

Collins, Allan. 2006. Cognitive apprenticeship. In *Cambridge handbook of the learning sciences*, edited by R. K. Sawyer, 47-60. Cambridge: Cambridge University Press.

Conger, Joan E. 2001. Wake up that back row! Interactive library instruction without hands-on student computers. *Reference Librarian* 35 (73):309-322. http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=4887930&site=ehost-live.

Dabbour, Katherine Strober. 1997. Applying active learning methods to the design of library instruction for a freshman seminar. *College & Research Libraries* 58:299-307.

Dahl, Candice C. 2004. Scenario-based active learning in a low-tech environment. *College & Undergraduate Libraries* 11 (2):17-24.

Darkenwald, Gordon G., and Sharan B. Merriam. 1982. *Adult education: Foundations of practice.* New York: Harper & Row.

David, Jane L. 2008. Project-Based Learning. *Educational Leadership* 65 (5): 80-82. http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=31501220&site=ehost-live.

Dewey, John. 1925. *Experience and Nature*. Chicago: Open Court.

Dimitroff, Alexandra , Annette M. Ancona, Susan B. Bernan, Angela M. Dodge, Keri L. Hutchinson Hutchinson, Melinda J. LaBonte, Tammy L. Mays, and Donald T. Simon. 1998. Problem-Based Learning in a health sciences librarianship course. *Bulletin of the Medical Library Association* 86 (3):340-345.Dodd, Lorna. 2007. The impact of Problem-Based Learning on the information behavior and literacy of veterinary medicine students at University College Dublin. *The Journal of Academic Librarianship* 33 (2): 206-216. doi: 10.1016/j.acalib.2006.12.008.

Donner, Robert S., and Harmon Bickley. 1993. Problem-Based Learning in American medical education: An overview. *Bulletin of the Medical Library Association* 81 (3): 294-298. http://www.ncbi.nlm.nih.gov.ezproxy.usd.edu/pmc/articles/PMC225793/pdf/mlab00112-0052.pdf.

Drueke, Jeanetta. 1992. Active learning in the university library instruction classroom. *Research Strategies* 10:77-83.

Duch, Barbara. 1996. Problems: A key factor in PBL. *About teaching: A newsletter of the Center of Teaching Effectiveness* 50. http://www.udel.edu/pbl/cte/spr96-phys.html.

Dyckman, Lisa M. 1995. Beyond "First you push this button, then...": A process-oriented approach to teaching searching skills. *Reference Librarian* 51/52:249-265.

Edens, Kellah M. 2000. Preparing problem solvers for the 21st Century through Problem-Based Learning. *College Teaching College Teaching* 48 (2):55-60. http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=3205443&site=ehost-live.

Eldridge, Jonathon D. 1993. A Problem-Based Learning curriculum in transition: The emerging role of the library. *Bulletin of the Medical Library Association* 81 (3): 310-315. http://www.ncbi.nlm.nih.gov.ezproxy.usd.edu/pmc/articles/PMC225796/pdf/mlab00112-0068.pdf.

Eldridge, Jonathan D. 2004. The librarian as tutor/facilitator in a Problem-Based Learning (PBL) curriculum. *Reference Services Review* 32 (1). doi:10.1108/00907320410509414.

Enger, Kathy Brock, Stephanie Brenenson, Katy Lenn, Margy MacMillan, Michele F. Meisart, Harry Meserve, and Sandra A. Vella. 2003. Problem-Based Learning: Evolving strategies and conversations for library instruction. *Reference Services Review* 30 (4):355-358.

Fosmire, Michael, and Alexius Macklin. 2002. Riding the active learning wave: Problem-Based Learning as a catalyst for creating faculty-librarian instructional partnerships. *Issues in Science and Technology Librarianship* 34. http://www.istl.org/02-spring/article2.html.

Frank, Moti, Ilana Lavy, and David Elata. 2003. Implementing the project-based learning approach in an academic engineering course. *International Journal of Technology and Design Education* 13:273-288.

Gallagher, Shelagh A. 1997. Problem-Based Learning. *Journal for the Education of the Gifted* 20 (4):332-362.

Gamson, Zelda F. 1994. Collaborative learning comes of age. *Change* 26 (5):44-49. http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=9409280778&site=ehost-live.

Gayton, Jeffrey T. 2008. Academic libraries: "Social" or "communal?": The nature and future of academic libraries. *Journal of Academic Librarianship* 34 (1):60-66. http://vnweb.hwwilsonweb.com.ezproxy.usd.edu/hww/results/external_link_maincontentframe.jhtml?_DARGS=/hww/results/results_common.jhtml.43.

George Lucas Educational Foundation. 2011. Edutopia Project-Based Learning Group. Accessed June 20, 2011. http://www.edutopia.org/groups/project-learning.

Gijselaers, Wim H. 1996. Connecting problem-based practices with educational theory. *New Directions for Teaching and Learning* 68:13-21.

Gil, Paul. 2010. What is the 'Invisible Web'? About.com. Accessed October 6, 2010. http://netforbeginners.about.com/cs/secondaryweb1/a/secondaryweb.htm.

Gokhale, Anuradha A. 1995. Collaborative learning enhances critical thinking. *Journal of Technology Education* 7 (1):22-30.

Grafstein, Ann. 2002. A discipline-based approach to information literacy. *Journal of Academic Librarianship* 28 (4): 197-204.

Gremmels, Gillian S. 1996. Active and cooperative learning in the one-shot BI session. In *New Ways of "Learning the Library"—and Beyond: Papers and Sessions Material Presented at the Twenty-third National LOEX Library Instruction Conference Held in Denton, Texas, 5 to 6 May 1995,* edited by L. Shirato, E. R. Bucciarelli and H. Mercado, 85-91. Ann Arbor: Pierian Press.

Grenzeback, Martha. 2009. Google @ your library. *Nebraska Library Association Quarterly* 40 (1):4-9.

Griffiths, Jillian R., and Peter Brophy. 2005. Student searching behavior and the Web: Use of academic resources and Google. *Library Trends* 53 (4):539-554. http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=16811207&site=ehost-live.

Head, Alison J., and Michael B. Eisenberg. 2009. Lessons learned: How college students seek information in the digital age (Project Information Literacy progress report). University of Washington Information School. Accessed June 7, 2011. http://projectinfolit.org/pdfs/PIL_Fall2009_Year1Report_12_2009.pdf

Helle, Laura, Päivi Tynjälä, and Erkki Olkinuora. 2006. Project-based learning in post-secondary education – Theory, practice, and rubber sling shots. *Higher Education* 51 (2):287-314. http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=19551448&site=ehost-live.

Heriot, Kirk C., Ronald G. Cook, Charles H. Matthews, and Leo Simpson. 2007. Creating active and high-impact learning. *Industry & Higher Education* 21 (6):427-434.

Herrington, Jan, and Ron Oliver. 2000. An instructional design framework for authentic learning environments. *Educational Technology Research and Design* 48 (3):23-48.

Higher Education Academy. *PBL directory.* Accessed June 20, 2011. http://feedback.bton.ac.uk/pbl/pbldirectory/index.php.

Higher Learning Commission. 2010. Criteria for accreditation. Higher Learning Commission. Accessed October 4, 2010. http://www.ncahlc.org/information-for-institutions/criteria-for-accreditation.html.

Hinchliffe, Lisa Janicke, and Beth S. Woodard. 2001. Instruction. In *Reference and information services: An introduction*, edited by R. E. Bopp and L. C. Smith, 177-209. Englewood,

CO: Libraries Unlimited.

Hollister, Christopher V., and Jonathan Coe. 2003. Current trends vs. traditional models: Librarians' views on the methods of library instruction. *College & Research Libraries* 10 (2):49-63.

Honebein, Peter C. 1996. Seven goals for the design of constructivist learning environments. In *Constructivist learning environments: Case studies in instructional design, edited by Brent Wilson, 11-24.* Englewood Cliffs, NJ: Educational Technology Publishing.

Hughes, Andrew S., Alan M. Sears, and Gerald M. Clarke. 1998. Adapting Problem-Based Learning to social studies teacher education. *Theory & Research in Social Education* 26 (4): 531-548. http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=36261925&site=ehost-live.

Jansen, Bernard J., Amanda Spink, and Tefko Saracevic. 2000. Real life, real users, and real needs: A study and analysis of user queries on the web. *Information Processing & Management* 36 (2):207-227.

Johnson, David W., Roger T. Johnson, and Karl A. Smith. 1991. *Active learning: Cooperation in the college classroom*. Edina, MN: Interaction Book Co.

John-Steiner, Vera, and Holbrook Mahn. 1996. Sociocultural approaches to learning and development: A Vygotskian framework. *Educational Psychologist* 31 (3/4):191-206. http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=9710150897&site=ehost-live.

Kanter, Steven L. 1998. Fundamental concepts of Problem-Based Learning for the new faciltator. *Bulletin of the Medical Library Association* 86 (3):391-395.

Kenney, Barbara Ferrer. 2008. Revitalizing the one-shot instruction session using Problem-Based Learning. *Reference & User Services Quarterly* 47 (4):386-391.

King, Alison. 1993. From sage on the stage to guide on the side. *College Teaching* 41 (1):30-35. http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=9706122970&site=ehost-live.

Kohl, David F., and Lizabeth A. Wilson. 1986. "Effectiveness of course-integrated bibliographic instruction in improving coursework." *RQ* 26:206-211.

Krajewski, Patricia R., and Vivienne B. Piroli. 2002. Something old, something new, something borrowed, something blue: Active learning in the classroom. *Journal of Library Administration* 36 (1/2):177-194. http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=7682342&site=ehost-live.

Kuhn, Thomas S. 1996. *The structure of scientific revolutions*. University of Chicago Press.

Lave, Jean. 1991. Situating learning in communities of practice. In *Perspectives on socially shared cognition*, edited by Lauren Resnick, John Levine and Stephanie Teasley, 63-82. Washington, DC: American Psychological Association.

Lave, Jean , and Etienne Wenger. 1991. *Situated learning : Legitimate peripheral participation*. New York: Cambridge University Press.

Lawrence, Steve, and C. Lee Giles. 1999. Accessibility of information on the Web. *Nature* 400 (8):107-109.

Lehr, Fran. 1985. "ERIC/RCS report: Instructional scaffolding." *Language Arts* 65:667-72.

Leibiger, Carol A. 2010. “Doctor, Doctor, my students have Googlitis!”: Faculty intervention via information literacy instruction. Great Plains Conference on the Teaching of the Social Sciences. Accessed October 15, 2010. http://orgs.usd.edu/gpctss/papers2010.htm.

Leibiger, Carol A. 2011. LibGuides on steroids: Expanding the user base of LibGuides to support library instruction and justify workload. University of South Dakota University Libraries. Accessed June 16, 2011. http://libguides.usd.edu/LibGuides_on_Steroids.

Lindstrom, Joyce, and Diana D. Shonrock. 2006. Faculty-librarian collaboration to achieve integration of information literacy. *Reference & User Services Quarterly* 46 (1):18-23. http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=22603922&site=ehost-live.

Mabry, Celia Hales. 1995. Using cooperative learning principles in BI. *Research Strategies* 13 (3):182-185.

Macklin, Alexius Smith. 2001. Integrating information literacy using Problem-Based Learning. *Reference Services Review* 29 (4):306-313.

Macklin, Alexius Smith 2002. Going to the library? You're virtually there: Problem-Based Learning for a 50-minute orientation. In *First impressions, lasting impact: Introducing the first-year student to the academic library,* edited by Julia K. Nims and Ann Andrew, 101-104. Ann Arbor: Pierian.

Mahaffy, Mardi. 2006. Encouraging critical thinking in student library research. *College Teaching* 54 (4): 324-327. http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=23337669&site=ehost-live.

Major, Claire H., and Betsy Palmer. 2001. Assessing the effectiveness of Problem-Based Learning in higher education: Lessons from the literature. *Academic Exchange Quarterly* 5 (1):4-9. http://www.rapidintellect.com/AEQweb/mop4spr01.htm.

Marcum, James W. 2002. "Rethinking information literacy." *Library Journal* 72:1-26.

Marfleet, Gregory B., and Brian J. Dille. 2005. Information literacy and the undergraduate research methods curriculum. *Journal of Political Science Education* 1 (2): 175-190. doi: 10.1080/15512160590961793.

Marshall, Joanne G., Dorothy Fitzgerald, Lorraine Busby, and Gwynneth Heaton. 1993. A study of library use in problem-based and traditional medical curricula. *Bulletin of the Medical*

Library Association 81 (3): 299-305. http://www.ncbi.nlm.nih.gov.ezproxy.usd.edu/pmc/articles/PMC225794/pdf/mlab00112-0057.pdf.

Mellon, Constance A. 1984. "Process not product in course-integrated instruction: A generic model of library research." *College & Research Libraries* 45 (6):471-478.

Meyer, Debra K. 1993. What is scaffolded instruction? Definitions, distinguishing features, and misnomers. In *Examining central issues in literacy research, theory, and practice*, edited by D. J. Lev and C. K. Kinzer, 41-53. Chicago: National Reading Conference.

Miller, Todd. 2005. In defense of stupid users. *Library Journal* 130 (5):58-58.

Morris, Debra S., and Bonnie Armbruster. 2003. Active learning. In *The Greenwood dictionary of education*, edited by J. W. I. Collins and N. P. O'Brien, 5. Westport, CT: Greenwood.

Munro, Karen. 2006. Modified problem-based library instruction: A simple, reusable instruction design. *College & Undergraduate Libraries* 13 (3):53-58.

National Center for Education Statistics. 2007. Supplemental academic libraries survey 2004. Government Printing Office. Accessed November 25, 2010. http://nces.ed.gov/pubs2007/2007301.pdf.

National Center for Education Statistics. 2010. Supplemental academic libraries survey 2008. Government Printing Office. Accessed November 25, 2010. http://nces.ed.gov/pubs2010/2010348_1.pdf.

National Institute of Education. Study Group on the Conditions of Excellence in American Higher Education. 1984. *Involvement in learning: Realizing the potential of American higher education*. Washington, DC: Government Printing Office.

Newman, Frank. 1985. *Higher education and the American resurgence*. Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.

Norman, Geoffrey R., and Henk G. Schmidt. 1992. The psychological basis of Problem-Based Learning: A review of the evidence. *Academic Medicine* 67 (9):557-565.

Oberman, Cerise , and Rebecca A. Linton. 1982. Guided Design: Teaching library research as problem-solving. In *Theories of bibliographic education: Designs for teaching*, edited by Cerise Oberman and Katina Strauch, 111-134. New York: Bowker.

O'Brien, Nancy Patricia. 2003. Situated learning. In *The Greenwood dictionary of education*, edited by J. W. I. Collins and N. P. O'Brien, 324. Westport, CT: Greenwood.

OCLC Online Computer Library Center. 2005. College students' perceptions of libraries and information sources. OCLC Online Computer Library Center. Accessed October 5, 2010. http://www.oclc.org/reports/perceptionscollege.htm.

Oddi, Lorys. 1983. The lecture: An update on research. *Adult Education Quarterly* 33 (4):222-229.

Ohles, Janet A. 1997. Problem-Based Learning. *Medical Reference Services Quarterly* 16 (2):11-21.

Oliver, Ron, and Jan Herrington. 2001. *Teaching and learning online: A beginner's guide to e-learning and e-teaching in higher education*. Perth, WA: Edith Cowan University.

Orr, Debbie, Margaret Appleton, and Margie Wallin. 2001. Information literacy and flexible delivery: Creating a conceptual framework and model. *Journal of Academic Librarianship* 27 (6):457-463. http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=5602718&site=ehost-live.

Owusu-Ansah, Edward K. 2003. Information literacy and the academic library: A critical look at a concept and the controversies surrounding it. *Journal of Academic Librarianship* 29 (4): 219-230. http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=10684069&site=ehost-live.

Page, Diana, and Arup Mukherjee. 2000. Improving undergraduate student involvement in management science and business writing courses using the Seven Principles in Action. *Education* 120 (3):547-557.

Palincsar, Annemarie Sullivan, Dannelle D. Stevens, and James R. Gavelek. 1989. Collaborating with teachers in the interest of student collaboration. *International Journal of Educational Research* 13 (1):41-53.

Pelikan, Michael. 2004. Problem-Based Learning in the library: Evolving a realistic approach. *portal: Libraries and the Academy* 4 (4):509-520. http://muse.jhu.edu/journals/portal_libraries_and_the_academy/v004/4.4pelikan.html.

Plowright, David, and Mary Watkins. 2004. There are no problems to be solved, only inquiries to be made, in social work education. *Innovations in Education & Teaching International* 41 (2):185-206. http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=13396320&site=ehost-live.

Pundak, David, Orit Herscovitz, Miri Shacham, and Rivka Wiser-Biton. 2009. Instructors' attitudes toward active learning. *Interdisciplinary Journal of E-Learning & Learning Objects* 5:215-232. http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=48317316&site=ehost-live.

Rader, Hannelore B. 2001. A new academic library model. *College & Research Libraries News* (4):393-396. http://search.ebscohost.com/login.aspx?direct=true&db=lxh&AN=4659038&site=ehost-live.

Rankin, Jocelyn A. 1992. Problem-based medical education: Effect on library use. *Bulletin of the Medical Library Association* 80 (1):36-43.

Ridgeway, Trish. 1989a. Active learning methods in the one-hour bibliographic instruction lecture. In *Defining and applying effective teaching strategies for library instruction,*

edited by Mary Beth Bunge and Teresa B. Mensching, 61-63. Ann Arbor, MI: Pierian Press.

Ridgeway, Trish. 1989b. Integrating active learning techniques into the one-hour bibliographic instruction lecture. In *Coping with information illiteracy: Bibliographic instruction for the information age. Papers presented at the Seventeenth National LOEX Library Instruction Conference,* edited by Glenn E. Mensching and Teresa B. Mensching, 33-42. Ann Arbor, MI: Pierian Press.

Rogers, Carl R. 1969. *Freedom to learn: A view of what education might become*. Columbus, OH: C. E. Merrill.

Rossin, David, and Terry Hyland. 2003. Group work-based learning within higher education: An integral ingredient for the personal and social development of students. *Mentoring & Tutoring: Partnership in Learning* 11 (2):153-162. http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=10573522&site=ehost-live.

Saturday, Janice, Bonnie Armbruster, Russell Binkley, and Barbara Thayer-Bacon. 2003. Constructivism. In *The Greenwood dictionary of education,* edited by J. W. Collins III and Nancy P. O'Brien, 75-76. Westport, CT: Greenwood.

Saunders, E. Stewart. 2003. The effect of bibliographic instruction on the demand for reference services. *portal: Libraries and the Academy* 3 (1):35-39. http://muse.jhu.edu/journals/portal_libraries_and_the_academy/v003/3.1saunders.html.

Saunders, Kathleen, Diana E. Northup, and Stewart P. Mennin. 1985. The library in a problem-based curriculum. In *Implementing problem-based medical education: Lessons from successful innovations*, edited by Arthur Kaufman, 71-88. New York: Springer.

Savery, John R., and Thomas M. Duffy. 1995. Problem-based learning: Instructional model and its constructivist framework. *Educational Technology* 35 (5):31-37.

Shapiro, Jeremy J., and Shelley K. Hughes. 1996. Information literacy as a liberal art: Enlightenment proposals for a new curriculum. *Educom Review* 31 (2). http://net.educause.edu/apps/er/review/reviewarticles/31231.html.

Shirato, Linda, and Joseph Badics. 1997. Library instruction in the 1990's: A comparison with trends in two earlier LOEX surveys. *Research Strategies* 15 (4):223-237.

Shrum, Judith L., and Eileen W. Glisan. 2005. *Teacher's handbook: Contextualized language instruction*. Boston: Heinle & Heinle.

Smith, Daryl G. 1977. College classroom interactions and critical thinking. *Journal of Educational Psychology* 69 (2):180-190. http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=edu-69-2-180&site=ehost-live.

Smith, Risë L. 1997. *Philosophical shift: Teach the faculty to teach information literacy.* Association of College & Research Libraries. Accessed March 6, 2011. http://www.ala.org/ala/mgrps/divs/acrl/publications/whitepapers/nashville/smith.cfm.

Smith, Stefan A. 2004. Designing collaborative learning experiences for library computer classrooms. *College & Undergraduate Libraries* 11 (2):65-82.

Snavely, Loanne. 2004. Making Problem-Based Learning work: Institutional changes. *portal: Libraries and the Academy* 4 (4):521-531. http://muse.jhu.edu/journals/portal_libraries_and_the_academy/v004/4.4snavely.html.

South Dakota Board of Regents Committee on Academic and Student Affairs. *Baccalaureate General Education Curriculum.* South Dakota Board of Regents. Accessed June 17, 2011. http://www.sdbor.edu/policy/2-academic_affairs/documents/2-7.pdf.

Spence, Larry. 2004. The usual doesn't work: Why we need Problem-Based earning. *portal: Libraries and the Academy* 4 (4):485-493. http://muse.jhu.edu/journals/portal_libraries_and_the_academy/v004/4.4spence.html.

Stevens, Christy R. 2007. Beyond Preaching to the Choir: Information Literacy, Faculty Outreach, and Disciplinary Journals. *The Journal of Academic Librarianship* 33 (2): 254-267. doi: 10.1016/j.acalib.2006.08.009.

Stevens, Christy, and Patricia J. Campbell. 2007. The politics of information literacy: Integrating information literacy instruction into the Political Science curriculum. In *Information Literacy Collaborations that Work*, edited by Trudi E. Jacobson and Thomas P. Mackey, 123-145. New York: Neal-Schuman.

Stevens, Christy R., and Patricia J. Campbell. 2008. Collaborating with librarians to develop lower division Political Science students' information literacy competencies. *Journal of Political Science Education* 4 (2): 225-252. doi: 10.1080/15512160801998114.

Thomas, John W. 2000. *A review of research on Project-Based Learning.* Accessed June 12, 2011. http://www.autodesk.com/foundation/pbl/research.

Tierno, M. J. , and J. H. Lee. 1983. Developing and evaluating library research skills in education: A model for course-integrated bibliographic instruction. *RQ* 22:284-291.

Tuckett, Harold W., and Carla J. Stoffle. 1984. Learning theory and the self-reliant library user. *RQ* 24:58-66.

Tuominen, Kimmo, Reijo Savolainen, and Sanna Talja. 2005. Information literacy as a sociotechnical practice. *Library Quarterly* 75 (3):329-345.

University of Delaware Institute for Transforming Undergraduate Education. 2011. *Problem-Based Learning at the University of Delaware.* Accessed June 20, 2011. http://www.udel.edu/ inst/.

U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills. 1991. What work requires of schools: A SCANS report for America 2000. Government Printing Office. Accessed June 14, 2011. http://wdr.doleta.gov/SCANS/whatwork/whatwork.pdf.

Urban Dictionary. 2010. Google. Urban Dictionary. Accessed October 6, 2010. http://www. urbandictionary. com/define.php?term=Google.

Urban Dictionary. 2010. Googlesphere. Urban Dictionary. Accessed October 6, 2010. http://www. urbandictionary.com/define.php?term=googlesphere.

Vine, Rita. 2004. Going beyond Google for faster and smarter web searching. *Teacher Librarian* 32 (1):19-22. http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN= 14658048&site=ehost-live.

Vos, Henk, and E. de Graaff. 2004. Developing metacognition: a basis for active learning. *European Journal of Engineering Education* 29 (4):543-548. http://search.ebscohost. com/login.aspx?direct=true&db=ehh&AN=15328542&site=ehost-live.

Vygotsky, Lev S. 1978. *Mind and society*. Cambridge, MA: Harvard University Press.

Warmkessel, Marjorie M., and Joseph M. McCade. 1997. "Integrating information literacy into the curriculum." *Research Strategies* 15:80-88.

Watkins, Martha. 1993. Characteristics of services and educational programs in libraries serving problem-based curricula: A group self-study. *Bulletin of the Medical Library Association* 81 (3): 306-309. http://www.ncbi.nlm.nih.gov.ezproxy.usd.edu/pmc/articles/ PMC225795/pdf/mlab00112-0064.pdf.

Whitehead, Martha J., and Catherine A. Quinlan. 2003. Information Literacy in Higher Education. *Feliciter* 49 (1): 22-24. http://search.ebscohost.com/login.aspx?direct= true&db=aph&AN=9360904&site=ehost-live.

Williams, Karen, and Jennifer Cox. 1992. Active learning in action. *RQ* 31 (3):326-331.

Wood, David, Jerome S. Bruner, and Gail Ross. 1976. The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry* 17:89-100.

Zipf, G. 1949. *Human behavior and the principle of least effort*. Reading, MA: Addison-Wesley.